FW-DOC-051

FILLER WIRE DEVELOPMENT FOR 2195 ALUMINUM-LITHIUM

Part II Final Report- November 1998

Contract No. NAS8-39929

Gerald W. Bjorkman Dr. Alex Cho

LOCKHEED MARTIN

FW-DOC-051

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LOCKHEED MARTIN



CORPORATE RESEARCH AND DEVELOPMENT

METALLURGY DEPARTMENT Materials Characterization

LETTER REPORT NO. MCR 98-058-A

March 18, 1998

IN-26

To:

A. Cho

CRD/4

093970

From:

J. T. White

CRD/4

Route:

W. A. Cassada

CRD/4

D. H. Scott

CRD/4

Subject:

Stress Corrosion Cracking Evaluation of Welded Al-Li Plate

(Project No. 1708)

Summary

Forty-day alternate immersion (AI) exposure has been completed on 8 welded 2195 stress corrosion samples. No stress corrosion cracking (SCC) was found on any of the samples tested. All 8 samples experienced exfoliation corrosion attack in the heat-affected zone (HAZ) adjacent to the weld. All samples were examined metallographically and showed varying degrees of intergranular corrosion (IG). The filler metal on all samples showed moderate to heavy pitting.

Objective

To determine the susceptibility of submitted welded 2195 plate in an AI environment.

Background

Samples were received machined to a thickness of 0.3125" -- length of 10" and width of 1". The plate alloy was 2195, and the weld filler alloys were Development ID #'s 15, 16, 17, and 18.

Identification markings for the samples:

• 15B-SCC002

• 16B-SCC003

18B-SCC002

• 15B-SCC003

• 17B-SCC002

18B-SCC003

• 16B-SCC002

• 17B-SCC003

Procedure

Samples were stressed to 50 ksi using the double bent beam method (ASTM Standard G39). Samples were then degreased in acetone and exposed to 3.5% NaCl AI exposure (ASTM Standard G44) for a period of 40 days. At 10, 20, and 30 days all samples were inspected for SCC using a microscope, without disturbing the corrosion product. They were then replaced on test.

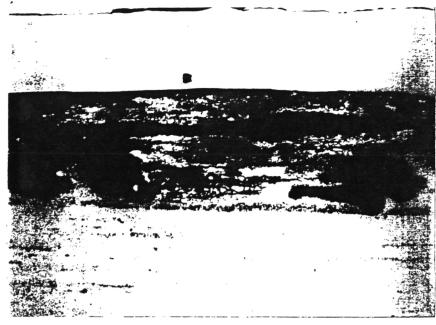


Figure 1
Photomicrograph showing typical exfoliation in the HAZ.

Magnification: 100X



Figure 2
Photomicrograph showing typical IG attack.

Magnification: 100X

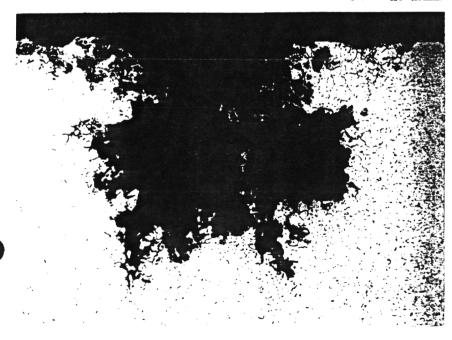


Figure 3
Photomicrograph showing mode of corrosion attack to the filler metal to be pitting.

Magnification: 100X

APPENDIX A FILLER WIRE CHEMISTRY ANALYSIS

TARGET FILLER WIRE CHEMISTRIES

Chem	Cu	Ag	Mg	Zn	Mn	Ti	Zr
15	6.00		0.40	0.40		0.15	0.16
16	6.00	0.40		0.40		0.25	0.25
17	6.00	0.40	0.40			0.25	0.25
18	6.00	0.40				0.25	0.25
19	6.00	0.40			******************	0.25	
20	6.00	0.40			0.3	0.25	

FILLER WIRE CHEMISTRY ANALYSIS*

Chem	Cu	Ag	Mg	Zn	Mn	Ti	Zr	S/N
15	6.55		1 067	0.52	5.	0.14	0.18	72222-2A
15	6.71		0.75	0.55		0.20	0.18	72222-2B
15	7.00		0.54	0.61		0.06	0.22	72222-S
16	6.48	0.53	š.	0.58	1000	0.24	0.28	72219-4A
16	6.01	0.50		0.53		0.23	0.23	72219-4B
16	6.58	0.45		0.56		0.26	0.28	72221-S
17	5.61	0.43	0.67			0.23	0.23	72220-3A
17	6.47	0.50	0.56			0.31	0.23	72220-3B
17	6.82	0.49	0.59			0.42	0.31	72223-S
18	6.08	0.47			Providence and Constitution of	0.24	0.22	72221-5A
18	6.27	0.50				0.25	0.23	72221-5B
18	6.20	0.42				0.25	0.24	72218-S
19	5.93	0.48			Particular de la companya de la comp	0.27		72218-1A
19	5.85	0.45				0.20		72218-1B
19	6.21	0.43				0.31		72219-S
20	6.34				0.26	0.30		72223-6A
20	6.24	0.47			0.27	0.29		72223-6B
20	Sent to N	/IcCook						72220-S

^{*}Chemistry Analysis performed using X-Ray Flourescence Spectroscopy

APPENDIX B PARENT MATERIAL DATA

2195 PARENT MATERIAL DATA REYNOLDS METALS COMPANY VPPA WELD TASK

YS	81.6	82.3	73.3	77.6	77.0	8.69	78.7	71.2	64.7
UTS	83.5	87.1	80.1	80.3	83.3	77.4	81.2	79.3	73.7
GAGE	0.4								
TEMPER GAGE UTS	T8R70								
Z	0.01								
Si	0.03						,		
Fe	0.04								
Mn	0.00								
Zn	0.00								
11	0.02								
Zr	0.12								
Ag	0.46								
Li Mg	0.44								
	1.05								
Cu	4.17								
CAST/ DROP	1140-12								
PLT#	1A1,1A1			181.182			2R1 2R2		
LOT#	934T649A 1A1,1A1 1140-12 4.17 1.05 0.44 0.46 0.12 0.02 0.00 0.00 0.04 0.03 0.01								





STRETCH FORMING
HOT FORMING
MACHINING
PROCESSING

131 E. GARDENA BOULEVARD / P.O. BOX 2310 / GARDENA, CALIFORNIA 90247-0310

TELEPHONE 310 / 532-1810 / FAX 310 / 715-1492

CERTIFICATION OF CONFORMANCE

CUSTOMER: MARTIN M	ARIETIA	P.O. #:	1350028
PART NUMBER: FLAT PLA	TE SLAVAGE	REVISION:_	N/A
QUANTITY: 11 H/L #:_	NOTED BELOW	SHIPPER #:_	23152
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SOL. HEAT TREAT	SOW 935°-955°F M	<u>IN. (1</u>) HR	TICORM
STRETCH LEVEL	SOW 2.75-4.5%		AHF-DUCOMMUN
AGE	SOW 290°F FOR 36	HOURS	TICORM
MECHANICAL PROPERTIES	SOW, STP 1008		DURKEE TEST LABS
	H/L #950M023B, PL	ATES 1B, 2	B, 3B, 4B, 1A
	950M024A, PL	ATES 1B, 2	B, 3B, 1A, 2A, 3A
FINAL ACCEPTANCE 01	-19-96 (AHF) Q.F	L. REP.	Die sun sid

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SIGNATURE

IARTIN MARIETTA

PROCUREMENT QUALITY ACCEPTANCE REPORT

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applicable subcontract surveillance plan. Authorized variations, if any, are documented on the referenced Nonconformance Document (NCD).

MAKIIN MAKIELLA KEPHESENIALIVE

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MARSHALL SPACE FLIGHT CENTER MARTIN MARIETTA CORPORATION HUNTSVILLE, AL BUILDING 4705

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CERTIFICATE OF CONFORMANCE ENCLOSED

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GARDEMA, CA. 90247-0310

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	H/L#950M024A	A	1-10-96 AHD	

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(213) 532-0419

TICORM INC.

355 W. ALONDRA BLVD. • GARDENA, CALIFORNIA 90248

No. 37323

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- . P.O. BOX 2310
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TICORM, INC.

AUTHORIZED SIGNATURE

Jan. 18. 1996 4:19PM

Durkee Testing Laboratories, Inc.

MECHANICAL PROPERTIES REPOR

LAB NO.

P.O. BOX 1401 • 15700 Texaco Street • Paramount, CA 90723 • (310) 531-7111

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LOG NO.

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Quantity Cust Item Test Description Item

MECHANICAL

Haterial

2195-T8A3 AL/LITH

(6) TEST PARTS, IDENTIFIED AS FOR P/N FLAT PLATE SALV., (.260)

C

CUST P.O.

REF: W/O #34191040, 34191050, 34191080, 34191070, 34191060

S/N'S 950M024A, 950M023B CUSTOMER: MARTIN MARIETTA

6

Reqs.	IO.	Actual Size	Actual Area	Yield Load a .2%	Yield PSI a .2%	Tensile Load a max	Tensile PSI 2 mex	Elong Inch – 2.00	Elong (%)	Reduced Dimension	R/A (%)	No1
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2	24A-LT	0.2400/0.5010	.12024	9220	76680	10000	83170	0.290	14.500			
3	244-45*	0.2400/0.5000	, 12000	8420	70170	9100	75830	0.330	16.500			
1	238-L	0.2370/0.5010	.11874	10050	84640	10500	88430	0.220	11.000			
2	23B-LT	0.2380/0.5010	.11924	9500	79670	10050	84280	0.260	13.000			
3	23 8-4 5°	0.2370/0.5010	.11874	8300	69900	8950	75380	0.320	16.000			

Minimum Requirements: 1 Minimum Requirements: 2 Minimum Requirements: 3	73000	78000	6.000	0.000
	73000	78000	8.000	0.000
	66000	73000	8.000	0.000

By: SE 55

Material(s) conform to specifications

Respectfully Submitted,

RALPH P. HARRISON

GENERAL MANAGER

213) 532-0419

355 W. ALONDRA BLVD. • GARDENA, CALIFORNIA 90248

No. 37382

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166 E. GARDINA BLVD.

GARDENA, CA 90247-0310

GLEDENA, CA 90248-2811

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PER MIL-A-22771

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TICORM, INC.

NOTES

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. 268 E. GRADENA BLAD.

CANDEDA, CA 90245-2811

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- * GARDERA, CB 90248-2811

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TICORM INC

(213) 532-0419

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No. 37344

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. GARDENA, CA 90247-0310

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SPECIFICATION USED	SOLUTION TREATMENT	1% HOURS	945 ⋅₽	8	LOAD NO. 0158
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355 W. ALONDRA BLVD. • GARDENA, CALIFORNIA 90248

No. 37345

INVOICE ARE DUCCESSES INCUSTORATED SOLD TO P.G. BOX 2310 GARDENA, CA 90247-0310 GAMDERA, CA 93248-2011 **TERMS: NET 30 ON APPROVED CREDIT** CUSTOMER'S SHIPPER # DATE SHIPPED DATE RECEIVED | CUSTOMER'S P.O. # TICORM QUOTE # 01/10/96 20777 20978 QUANTITY PART NO. AND DESCRIPTION . 2 FLAT PLATE SALV ITEM 1 23C 964262136010 HATERIAL 2195-0 SOLUTION TO 2195-NO HIL #950MORNA + Date 36,3A W/0 # 34191060
34191070 **CERTIFICATION OF PROCESS PERFORMED PROCESS** MATERIAL USED TIME TEMPERATURE FURN, NO. LOAD NO. OR REMARKS ANNEALING OR 2195-0 STRESS RELIEVE ۰F SPECIFICATION USED SOLUTION TREATMENT 1% HOURS 945 ۰F 8 LOAD NO. 0157 13 SEC UCON 14.2% QUENCHING TIME OUT OF QUENCH: 'ER P.O. 1:05 P.M. DATE: 1/11/9 ۰F AGING TREATMENT ۰F HOT STRAIGHTENING ۰F HOT FORMING •F HARDNESS VALUES ROCKWELL **OTHER** % TESTED ---**ELECTRO-CONDUCTIVITY** PER MIL-A-22771 % I.A.C.S. READINGS.

AND INVOICE NUMBER

No. 37346

355 W. ALONDRA BLVD. • GARDENA, CALIFORNIA 90248

INVOICE DATE

SOLD TO

(213) 532-0419

MY DUCTHIE INCORPORATED

F.O. EDI 2310

GARDENA, CA 90247-0310

SHIP TO

ZCO E. CARDENA BLVD.

GARDENA. CA 90246-2511 ,

DATE RECEIVED	ON APPROVED CREDIT CUSTOMER'S P.O. #	TICORM QUOTE #	CUSTOMER'S S	HIPPER #	DATE SHIPPED
01/10/36 ·	207 77		20978		
QUANTITY	PART NO. AND DES	SCRIPTION		**************************************	
2	PLAT PLATE SALV		e somewak eye.	a in the same with the	1
	172: 1 20 804202130310				
~ **	SULUTION TO 2195-AQ				to the same of the
	H/L#950M023B,	BE, Al Zetola	-		
				MARIET	A
			#34,	91070	

CERTIFICATION OF PROCESS PERFORMED

					1	<u>.</u>	
MATERIAL USED	PROCESS	TIME	TEMPERATURE	FURN. NO	ا مسمد سا	OAD NO. OR I	REMARKS
195–0	ANNEALING OR STRESS RELIEVE						
SPECIFICATION USED	SOLUTION TREATMENT	1a HRS	945 °F	13	TOND NO	. 0156	ا المام المنظم
	QUENCHING	13 SEC	UCON 14.2% .F	1	TIME CO	T OF QUENCH	: 10:10 A.M.
ER P.O.			°F		DRIES	01/11/96	
	AGING TREATMENT		°F				
	HOT STRAIGHTENING		•F				27
	HOT FORMING		•F			· · · · · · · · · · · · · · · · · · ·	
HARDNESS VALUES	ROCKWELL		. отн	ER .		%	TESTED
ELECTRO-CONDUCTIVITY PER MIL-A-22771							
	READINGS		% I.A.C.S.			% ·	TESTED
						TICORM	INCITICOR

NOTES

BY AUTHORIZED SIGNATURE

APPENDIX C VPPA WELD SCHEDULES

	·	

Page 1 of 1

WELD C	LASSIFIC	ATION:	DEVEL	OPMEN.	Т		٧V	veiding	g Data		FR	EWELD	23	+ 41	1662	
WELD		SPLIT	W	ELD TY	PE	REPAI	R AREA	AS C	PLA	NISH	WE	LDER		DER'S G ID		AL WELD DATE
F024	4	N/A		INITIAL	-	0	0	0	N	I/A	ME	LSON			!	9/23/98
	PF	ROGRAM			WEI	LD PRO	OCESS	S V	WELDI	NG PO	SITION	BUILDIN	IG NO	1	ELD TURE	WELD STATION
	Al-Li A	Alternate Fill	er			VPP	4		VI	ERTICA	L	471	1		2	2
MAT	L TYPE	MAT	THICK	NESS	М	ATL M	ANF		LE	FT PIE	CE	RIGHT I	PIECE		MATI	_ S/N
2	2195		0.2			RMC	;		09	400001	33	083000	0537		N	Ά
TORC	Н ТҮРЕ	TORC	I LEAD A	ANGLE	SHIE	LD CU	Р ТҮР	PE	WIF	RE ALL	OY	WIRE HE	AT LOT	-	WIRE	MFG
HSE	EC300A		3		HSE	EC REC	GULAR	₹		#16		7222	1-S		RN	IC
ELEC	т. түре		CKPURG 1/GAS2 1		BACK	CPURG	SE TYI	PE	POW	ER SUI	PPLY	TRAILING TYP) TF		SHIELD
2% T	horiated		HELIUM		TR	RAVELS	SHOE			VP300		N/A	4		N.	/A
PREWEL	LD PANEL	CLEANING	: Solvent	wipe, file	abuttin	ng edge	s, scra	pe top/	bottom	adjacer	t land surfa	ices, tack				
СОММЕ	NTS:									TEMP	ERATURE	1	72	ниміс	DITY	
COMME		Penetration Control	Current	Voltage	Gas	a Plas		hield low		TEMP Travel Rate	Plasma Gas	Shield Gas		Orifice Size	Torch Stand	
/eld Pass	Weld	Control	Current	Voltage				low	Rate	Travel	Plasma		Wire Dia.	Orifice	Torch	
√eid Pass	Weld Schedule	Control			Gas Pres.	Flow	Fi	low	Rate 20	Travel Rate	Plasma Gas	Shield Gas	Wire Dia.	Orifice Size	Torch Stand Off	Set Back
Jeld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW	Control AVC	122 100 Added Reverse	20.5 18.5 Back Purge Total G	Gas Pres. 14 6 Bac Pur as Gas	3.4 1.8 ck rge s1/Gas2	80 80 Baci Purg	low	20 25	Travel Rate	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM C. Arc Osc.	Wire Dia. 0.063	Orifice Size 0.125 0.125	Torch Stand Off 0.2 0.2 linte d pas:	0.045 0.045 Manual
/eld Pass ST (PEN) ND	Weld Schedule ALTFW18 ALTFW Straight Polarity	AVC AVC AVC Reverse Polarity Time	122 100 Added Reverse	20.5 18.5 Back Purge	Gas Pres. 14 6 Bac Pur	3.4 1.8 ck rge s1/Gas2	80 80 Baci Purg	low)) ;k ;ge ssure	Rate 20 25 Arc Os	Travel Rate 9.8 8.8 sc. Arc Osc.	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM C. Arc Osc.	wire Dia. 0.063 0.063 Arc Osc	Orifice Size 0.125 0.125	Torch Stand Off 0.2 0.2 linte d pas:	Set Back 0.045 0.045 Manual Weld
Jeld Pass ST (PEN) ND	Weld Schedule ALTFW18 ALTFW Straight Polarity Time	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current	20.5 18.5 Back Purge Total G	Gas Pres. 14 6 Bac Pur as Gas Flo	3.4 1.8 1.8 ck rge s1/Gas2	80 80 80 Baci Purg Pres	low)) k ge ssure	20 25 Arc Os Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM C. Arc Osc.	Wire Dia. 0.063 0.063 Arc Osc Amp.	Orifice Size 0.125 0.125	Torch Stand Off 0.2 0.2 Integrated Term	Set Back 0.045 0.045 Manual Weld
Veld Pass ST (PEN) ND Veld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current	20.5 18.5 Back Purge Total G Flow	Gas Pres. 14 6 Bac Pui as Gas Flo 100	3.4 1.8 1.8 ck rge s1/Gas2	80 80 80 Baci Purg Pres	low)) k ge ssure	20 25 Arc Os Dwell N/A	Travel Rate 9.8 8.8 Sc. Arc Osc. Freq N/A	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM C. Arc Osc. Pos. N/A	o.063 0.063 Arc Osc Amp.	Orifice Size 0.125 0.125 Trailir Shiel Flov N/A	Torch Stand Off 0.2 0.2 linte pas: Term 72	0.045 0.045 Manual Weld
Veld Pass ST (PEN) ND Veld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current 50 50	20.5 18.5 Back Purge Total G Flow 100 100	Gas Pres. 14 6 Bac Pui as Ga: Flo 100 100 nfig	3.4 1.8 1.8 ck rge s1/Gas2	80 80 80 Baci Purg Pres	ik ge ssure	Arc Os Dwell N/A N/A	Travel Rate 9.8 8.8 Sc. Arc Osc. Freq N/A	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM c. Arc Osc. Pos. N/A N/A Joint	Wire Dia. 0.063 0.063 Arc Osc Amp. N/A N/A Config	Orifice Size 0.125 0.125 Trailir Shiel Flov N/A	Torch Stand Off 0.2 0.2 Integrated Term 72 72	0.045 0.045 Manual

WELD	LASSIFIC	SPLIT	1A	ELD TY	/PE	REPAIR	AREAS	PI A	NISH	FRE	LDER	WEI	DER'S		IAL WELD
PANEI	L ID	OI LII				A B					LULIX		G ID		DATE
F02	5	N/A		INITIAL	L L	0 0	0	١	1/A	PA	SEUR				9/23/98
	PF	ROGRAM			WEL	D PROC	CESS	WELDI	NG POS	SITION	BUILDIN	IG NO		ELD TURE	WELD STATION
	Al-Li A	Alternate Fill	er			VPPA		V	ERTICA	L.	471	1		2	2
MAT	L TYPE	MAT	L THICK	NESS	M	ATL MA	NF	LE	FT PIE	CE	RIGHT	PIECE		MAT	L S/N
2	2195		0.2			RMC		09	900001	38	099000	0137		١	/A
TORC	Н ТҮРЕ	TORC	H LEAD /	ANGLE	SHIE	LD CUP	TYPE	WIF	RE ALL	OY	WIRE HE	AT LOT	•	WIRE	MFG
HSE	C300A		3		HSE	C REGL	JLAR			#17	7222	3-S		R	МС
ELEC	T. TYPE		CKPURO 1/GAS2		BACK	PURGE	TYPE	POW	ER SUF	PPLY	TRAILING TYF) TR		SHIELD AS
2% T	horiated		HELIUM		TR	AVEL SH	HOE		VP300		N/A	4		Ν	/A
PREWEL	D PANEL	CLEANING	: Solvent	wipe, file	e abutting	g edges,	scrape top	/bottom	adjacen	t land surfa	ces, tack				
COMME	NTS:								TEMPI	ERATURE		72	нимір	OITY	
COMME		Penetration Control	Current	Voltage	Gas	Plasma Flow	a Shield Flow		TEMPI Travel Rate	Plasma Gas	Shield Gas		Orifice Size	Torch	
eld Pass	Weld	Control	Current	Voltage				Rate	Travel	Plasma		s Wire Dia.	Orifice	Torch	
eld Pass	Weld Schedule	Control			Gas Pres.	Flow	Flow	Rate 20	Travel Rate 9.8	Plasma Gas	Shield Gas	Wire Dia.	Orifice Size	Torch Stand	Set Back
eld Pass ST (PEN)	Weld Schedule ALTFW18	Control AVC	122	20.4 18.6 Back Purge Total G	Gas Pres. 13.2 5.8 Bac Pure Gas	3.3 1.8 k ge 1/Gas2	Flow 80	20 25	Travel Rate 9.8	Plasma Gas ARGON ARGON Arc Os: Speed.	HELIUM HELIUM C. Arc Osc.	wire Dia. 0.063	Orifice Size 0.125 0.125	Torch Stand Off 0.2 0.2	0.045 0.045 Manual Weld
eld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity	AVC AVC Reverse Polarity Time	122 100 Added Reverse	20.4 18.6 Back Purge	Gas Pres. 13.2 5.8 Bac Pure	3.3 1.8 k ge 1/Gas2	80 80 Back Purge	20 25 Arc Os	Travel Rate 9.8 8.8 Sc. Arc Osc.	Plasma Gas ARGON ARGON Arc Os: Speed.	HELIUM HELIUM C. Arc Osc.	s Wire Dia. 0.063 0.063 Arc Osc	Orifice Size 0.125 0.125	Torch Stand Off 0.2 0.2	0.045 0.045 Manual Weld
T (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current	20.4 18.6 Back Purge Total G	Gas Pres. 13.2 5.8 Bac Pure Gas Flow	3.3 1.8 k ge 1/Gas2	80 80 Back Purge Pressure	20 25 Arc Os Dwell	Travel Rate 9.8 8.8 Sc. Arc Osc. Freq.	Plasma Gas ARGON ARGON Arc Os Speed.	HELIUM HELIUM C. Arc Osc. Pos.	s Wire Dia. 0.063 0.063 Arc Osc	Orifice Size 0.125 0.125 Trailin Shiele Flow	Torch Stanc Off 0.2 0.2	0.045 0.045 Manual Weld
eld Pass T (PEN) ID eld Pass T (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current 60	20.4 18.6 Back Purge Total G Flow	Gas Pres. 13.2 5.8 Bac Purg as Flow 100	3.3 1.8 k ge 1/Gas2	80 80 Back Purge Pressure N/A	20 25 Arc Os Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq.	Plasma Gas ARGON ARGON Arc Osc Speed.	HELIUM HELIUM Arc Osc. Pos. N/A	o.063 O.063 Arc Osc Amp.	Orifice Size 0.125 0.125 Trailin Shiele Flow	Torch Stand Off 0.2 0.2 0.2	Set Back 0.045 0.045 Manual Weld
eld Pass ET (PEN) ID eld Pass	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current 60 60	20.4 18.6 Back Purge Total G. Flow 100 rode Co	Gas Pres. 13.2 5.8 Bac Pure Gas Flow 100 100 nfig	3.3 1.8 k ge 1/Gas2 v	80 80 Back Purge Pressure	Arc Os Dwell N/A N/A	Travel Rate 9.8 8.8 Sc. Arc Osc. Freq. N/A	Plasma Gas ARGON ARGON Arc Osc Speed.	HELIUM HELIUM C. Arc Osc. Pos. N/A N/A Joint	s Wire Dia. 0.063 0.063 Arc Osc Amp. N/A N/A	Orifice Size 0.125 0.125 Trailin Shiele Flow	Torch Stand Off 0.2 0.2 0.2	Set Back 0.045 0.045 Manual Weld

	LASSIFIC		DEVEL		_			ng Data			EMELD				
WELD! PANEL		SPLIT	W	ELD TY	PE		R AREAS B C	PL	ANISH	WE	LDER		DER'S IG ID	1	AL WELD DATE
F027	7	N/A		INITIAL	-	0	0 0		N/A	ME	LSON	98XAL	TFW-108	1	0/16/98
	PF	ROGRAM			WEL	D PRO	CESS	WELD	ING PO	SITION	BUILDI	NG NO		ELD TURE	WELD
	Al-Li A	Alternate Filler	7			VPPA		V	/ERTICA	L	471	11		2	2
MAT	L TYPE	MATL	THICK	NESS	М	ATL M	ANF	LE	FT PIE	CE	RIGHT	PIECE		MAT	L S/N
2	2195		0.2			RMC		10	0000001	48	083000	00515		N	/A
TORC	Н ТҮРЕ	TORCH	LEAD A	NGLE	SHIE	LD CUI	TYPE	WI	RE ALL	OY	WIRE HE	AT LO	Г	WIRE	MFG
HSEC30	00A REV A	\	3		RED D	OT STA	ANDARD		#18		7221	8-s		RI	NC
ELEC	T. TYPE		KPURG GAS2 1		BACK	PURG	E TYPE	POW	ER SUF	PPLY	TRAILING TYI		D TR		SHIELD
	2%	1	HELIUM		TR	AVEL S	HOE		VP300		N/	A		N.	/A
PREWEL	D PANEL	CLEANING:									***				
COMME		CLEANING:							TEMPI	ERATURE		78	ниміс	DITY	50
СОММЕ	NTS:	Penetration		Voltage	Gas	a Plasn	na Shield Flow	Wire Rate	TEMPI Travel Rate	Plasma Gas	Shield Ga		HUMID Orifice Size	Torch Stand	Electrode
COMMEI	NTS:	Penetration Control		Voltage 20.5					Travel Rate	Plasma		s Wire	Orifice	Torch	Electrode
COMMEI	Weld Schedule	Penetration Control	Current		Gas Pres.	Flow	Flow	Rate	Travel Rate	Plasma Gas	Shield Ga	s Wire Dia.	Orifice Size	Torch Stand Off	Electrode Set Back
COMMEI	Weld Schedule ALTFW18 ALTFW	Penetration Control AVC AVC	Current 122 100 Added Reverse	20.5 18.5 Back Purge Total Ga	Gas Pres. 13.5 6 Bac Pur Gas	3.5 2 k ge s1/Gas2	80 80 Back Purge	20 25 Arc O Dwell	Travel Rate 9.8 8.8	Plasma Gas ARGON ARGON Arc Os Speed.	Shield Ga HELIUM HELIUM c. Arc Osc.	s Wire Dia. 0.063	Orifice Size 0.125 0.125	Torch Stand Off 0.18 0.21	Electrode Set Back 0.045 0.045
COMMEI /eld Pass ST (PEN) ND	Weld Schedule ALTFW18 ALTFW Straight Polarity	Penetration Control AVC AVC	Current 122 100 Added Reverse Current	20.5 18.5 Back Purge	Gas Pres. 13.5 6 Bac Pur	3.5 2 k ge s1/Gas2	80 80 Back Purge	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc.	Plasma Gas ARGON ARGON Arc Os Speed.	Shield Ga HELIUM HELIUM c. Arc Osc.	s Wire Dia. 0.063 0.063	Orifice Size 0.125 0.125	Torch Stand Off 0.18 0.21	Electrode Set Back 0.045 0.045
COMMEI /eld Pass ST (PEN) ND	Weld Schedule ALTFW18 ALTFW Straight Polarity Time	Penetration Control AVC AVC Reverse Polarity Time	Current 122 100 Added Reverse Current	20.5 18.5 Back Purge Total Ga	Gas Pres. 13.5 6 Bac Pur Gas Flor	3.5 2 k ge s1/Gas2	80 80 Back Purge Pressure	20 25 Arc O Dwell	P.8 8.8 Sc. Arc Osc. Freq.	Plasma Gas ARGON ARGON Arc Os Speed.	HELIUM HELIUM C. Arc Osc.	s Wire Dia. 0.063 0.063 Arc Osc Amp.	Orifice Size 0.125 0.125 c. Trailin Shiele Flow	Torch Stand Off 0.18 0.21 Ing Integral Integr	Electrode Set Back 0.045 0.045
COMMEI Veld Pass ST (PEN) ND Veld Pass	Weld Schedule ALTFW18 ALTFW Straight Polarity Time	Penetration Control AVC AVC Reverse Polarity Time 4 66	Current 122 100 Added Reverse Current	20.5 18.5 Back Purge Total Ga Flow 100	Gas Pres. 13.5 6 Bac Pur Gas Flor 100 80	Flow 3.5 2 ck ge s1/Gas2	80 80 80 Back Purge Pressure N/A	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq	Plasma Gas ARGON ARGON Arc Os Speed.	HELIUM HELIUM c. Arc Osc. Pos. N/A N/A	s Wire Dia. 0.063 0.063 Arc Osc Amp.	Orifice Size 0.125 0.125 c. Trailin Shiele Flow N/A N/A	Torch Stand Off 0.18 0.21 Ing Interest pass V Term 78	Electrode Set Back 0.045 0.045
eld Pass ET (PEN) Eld Pass ET (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time	Penetration Control AVC AVC Reverse Polarity Time 4 66	Current 122 100 Added Reverse Current	20.5 18.5 Back Purge Total Ga Flow 100	Gas Pres. 13.5 6 Bac Pur Gas Floo 100 80	Flow 3.5 2 ck ge st/Gas2	80 80 80 Back Purge Pressure	20 25 Arc O Dwell	Part Part Part Part Part Part Part Part	Plasma Gas ARGON ARGON Arc Os Speed.	HELIUM HELIUM C. Arc Osc. Pos. N/A N/A Join	s Wire Dia. 0.063 0.063 Arc Osc Amp. N/A N/A	Orifice Size 0.125 0.125 c. Trailin Shiele Flow N/A N/A	Torch Stand Off 0.18 0.21 Ing Interest pass V Term 78	Electrode Set Back 0.045 0.045

Page 1 of 1 #16 RP7 **Welding Data WELD CLASSIFICATION:** DEVELOPMENT WELDED **WELD TYPE** REPAIR AREAS **PLANISH** WELDER WELDER'S **INITIAL WELD** SPLIT LOG ID **PANEL ID** DATE В F020 9/24/98 N/A INITIAL 0 N/A **PASEUR PROGRAM WELD PROCESS WELDING POSITION BUILDING NO** WELD WELD FIXTURE STATION Al-Li Alternate Filler **VPPA VERTICAL** 4711 **MATL TYPE** MATL THICKNESS LEFT PIECE RIGHT PIECE MATL S/N MATL MANF 2195 0.2 **RMC** 0371B00116 0371B00240 N/A **TORCH TYPE TORCH LEAD ANGLE** SHIELD CUP TYPE **WIRE MFG WIRE ALLOY WIRE HEAT LOT** HSEC300A HSEC REGULAR 72221-S 3 #16 **RMC ELECT. TYPE BACKPURGE BACK PURGE TYPE POWER SUPPLY TRAILING SHIELD** TRAILING SHIELD **GAS1/GAS2 TYPE TYPE GAS** 2% Thoriated HELIUM TRAVEL SHOE VP300 N/A N/A PREWELD PANEL CLEANING: Solvent wipe, file abutting edges, scrape top/bottom adjacent land surfaces, tack HUMIDITY **COMMENTS: TEMPERATURE** 72 Weld Pass Weld Penetration Current Voltage Plasma Plasma Shield Wire Plasma Shield Gas Wire Orifice Torch Electrode Travel Schedule Control Gas Flow Flow Rate Rate Gas Dia. Size Stand Set Back Pres Off 1ST (PEN) ARGON 0.045 ALTFW18 AVC 122 20.5 80 HELIUM 0.063 0.125 14.3 3.4 20 9.8 0.2 2ND ALTFW 100 6.3 1.8 80 25 8.7 ARGON HELIUM 0.063 0.125 0.2 0.045 Weld Pass Straight Added Trailing Back Arc Osc. Arc Osc. Arc Osc. Manual Reverse Back Back Arc Osc. Arc Inter Weld Polarity Pos. Polarity Reverse Purge Purge Purge Dwell Osc. Speed. Amp. Shield pass Gas1/Gas2 Time Time Current **Total Gas** Pressure Freq. Flow Temp Time Flow Flow 1ST (PEN) 19 4 60 100 N/A N/A N/A N/A N/A N/A N/A 72 2ND 19 60 100 100 N/A N/A N/A N/A N/A N/A N/A 72 4

Weld Pass	Electrode	Config		Joint Config
1ST (PEN)	Electrode Configuration 1 D C	Weldend By ground flat	A: 30 B: N/A C: 0.012 D: 0.156	Joint Configuration 1
2ND	Electrode Configuration 1 D C	Weldend ground flat	A: 30 B: N/A C: 0.012 D: 0.156	Square butt Joint

#16RP6 **Welding Data** WELD CLASSIFICATION: DEVELOPMENT REPAIR AREAS **INITIAL WELD** WELDED SPLIT **WELD TYPE PLANISH** WELDER WELDER'S PANEL ID LOG ID DATE В F019 N/A INITIAL 0 N/A **MELSON** 9/24/98 PROGRAM WELD PROCESS **WELDING POSITION BUILDING NO** WELD WELD **FIXTURE STATION** Al-Li Alternate Filler **VPPA VERTICAL** 4711 2 **MATL TYPE MATL THICKNESS** MATL MANF **LEFT PIECE RIGHT PIECE** MATL S/N 0371B00122 2195 0.2 **RMC** 0371B00123 N/A **TORCH TYPE TORCH LEAD ANGLE** SHIELD CUP TYPE **WIRE ALLOY WIRE HEAT LOT WIRE MFG** HSEC300A 3 HSEC REGULAR #16 72221-S RMC **ELECT. TYPE BACKPURGE BACK PURGE TYPE POWER SUPPLY** TRAILING SHIELD **TRAILING SHIELD GAS1/GAS2 TYPE TYPE GAS** 2% Thoriated **HELIUM** TRAVEL SHOE **VP300** N/A N/A PREWELD PANEL CLEANING: Solvent wipe, file abutting edges, scrape top/bottom adjacent land surfaces, tack **COMMENTS: TEMPERATURE** 72 HUMIDITY Weld Pass Weld Penetration Current Voltage Plasma Plasma Shield Wire Travel Plasma Shield Gas Wire Orifice Torch Electrode Schedule Control Gas Rate Rate Gas Dia. Size Stand Set Back Flow Pres Off ALTFW18 AVC 1ST (PEN) ARGON HELIUM 0.063 0.045 122 20.5 3.3 9.8 0.125 14.5 80 20 0.2 2ND ALTFW 100 18.6 6 1.8 80 25 8.8 ARGON HELIUM 0.063 0.125 0.2 0.045 Trailing Weld Pass Straight Added Arc Osc. Arc Osc. Arc Osc. Manual Reverse Back Back Back Arc Osc. Arc Inter Polarity Pos. Weld **Polarity** Reverse Purge Purae Purge Dwell Osc. Speed. Amp. Shield pass Time Time Current **Total Gas** Gas1/Gas2 Pressure Flow Temp Time Flow Flow 1ST (PEN) 60 N/A N/A N/A N/A N/A N/A 72 100 N/A 2ND 100 N/A 100 N/A N/A N/A 72 4 60 N/A N/A N/A Weld Pass **Electrode Config** Joint Config 1ST (PEN) 30 A: Electrode Configuration 1 Joint Configuration 1 N/A B T C: 0.012 D: 0.156 Square butt Joint

30

A: B: N/A

C: 0.012 D: 0.156

2ND

Electrode Configuration 1

D

#17RP6 **Welding Data WELD CLASSIFICATION:** DEVELOPMENT WELDED **WELD TYPE REPAIR AREAS PLANISH** WELDER'S **INITIAL WELD** SPLIT WELDER **PANEL ID** LOG ID DATE В F021 N/A INITIAL N/A MELSON 9/24/98 PROGRAM **WELD PROCESS WELDING POSITION BUILDING NO** WELD WELD **FIXTURE STATION** Al-Li Alternate Filler **VPPA** VERTICAL 4711 **MATL TYPE** MATL THICKNESS MATL MANF LEFT PIECE RIGHT PIECE MATL S/N 2195 0.2 **RMC** 0371B00227 0371B00224 N/A SHIELD CUP TYPE **TORCH TYPE WIRE HEAT LOT** WIRE MFG **TORCH LEAD ANGLE WIRE ALLOY** #17 HSEC300A HSEC REGULAR RMC 3 72223-S **ELECT. TYPE** BACKPURGE **BACK PURGE TYPE POWER SUPPLY** TRAILING SHIELD TRAILING SHIELD **GAS1/GAS2 TYPE TYPE** GAS 2% Thoriated HELIUM TRAVEL SHOE VP300 N/A N/A PREWELD PANEL CLEANING: Solvent wipe, file abutting edges, scrape top/bottom adjacent land surfaces, tack HUMIDITY **COMMENTS: TEMPERATURE** 72 Penetration Current Voltage Plasma Plasma Weld Pass Weld Shield Wire Plasma Shield Gas Wire Orifice Torch Electrode Travel Schedule Control Gas Flow Flow Rate Rate Gas Dia. Size Stand Set Back Pres Off 1ST (PEN) ALTFW18 AVC 124 ARGON 0.045 20.2 17.5 80 20 98 HELIUM 0.063 0.125 0.2 3.9 2ND ALTFW 100 18.4 6.2 1.8 80 25 8.8 ARGON HELIUM 0.125 0.2 0.045 0.063 Weld Pass Straight Added Back Back Arc Osc. Arc Arc Osc. Arc Osc. Arc Osc. Trailing Inter Manual Reverse Back Weld **Polarity** Polarity Reverse Purge Purge Purge Dwell Osc. Speed. Pos. Amp. **Shield** pass Time Time Current **Total Gas** Gas1/Gas2 Pressure Freq. Flow Temp Time Flow Flow 1ST (PEN) 19 60 100 N/A N/A N/A N/A N/A N/A N/A 72 2ND 60 100 100 N/A N/A N/A N/A 72 N/A N/A N/A 4 Weld Pass **Electrode Config** Joint Config 1ST (PEN) A: 30 Electrode Configuration 1 Joint Configuration 1 B: N/A D C: 0.012 D: 0.156 Square butt Joint

30

C: 0.012 D: 0.156

B: N/A

2ND

Electrode Configuration 1

D

#17RA7 **Welding Data** WELD CLASSIFICATION: DEVELOPMENT REPAIR AREAS **WELDED WELD TYPE PLANISH** WELDER'S **INITIAL WELD SPLIT** WELDER **PANEL ID** DATE LOG ID В C F022 N/A INITIAL N/A MELSON 9/23/98 0 **WELD PROCESS BUILDING NO PROGRAM WELDING POSITION** WELD WELD **FIXTURE STATION** Al-Li Alternate Filler **VPPA VERTICAL** 4711 2 MATL THICKNESS MATL TYPE MATL MANF **LEFT PIECE** RIGHT PIECE MATL S/N 0.2 0370B00128 2195 **RMC** 0371B00213 N/A **TORCH TYPE TORCH LEAD ANGLE** SHIELD CUP TYPE **WIRE ALLOY WIRE HEAT LOT WIRE MFG** HSEC300A 3 HSEC REGULAR 72223-S RMC # 7 **ELECT. TYPE BACKPURGE BACK PURGE TYPE POWER SUPPLY** TRAILING SHIELD TRAILING SHIELD **GAS1/GAS2 TYPE TYPE** GAS 2% Thoriated HELIUM TRAVEL SHOE VP300 N/A N/A PREWELD PANEL CLEANING: Solvent wipe, file abutting edges, scrape top/bottom adjacent land surfaces, tack **COMMENTS: TEMPERATURE** 72 **HUMIDITY** Weld Pass Weld Penetration Current Voltage Plasma Plasma Shield Wire Travel Plasma Shield Gas Wire Orifice Torch Electrode Gas Schedule Control Flow Flow Rate Rate Gas Dia. Size Stand Set Back Pres. Off 1ST (PEN) ALTFW18 AVC 2.9 ARGON HELIUM 0.063 0.125 0.045 121 19.5 11.6 80 20 9.7 0.2 2ND ALTFW AVC 100 18.6 6.1 1.8 80 25 8.8 ARGON HELIUM 0.063 0.125 0.2 0.045 Weld Pass Straight Added Back Trailing Manual Reverse Back Arc Osc. Arc Arc Osc. Arc Osc. Arc Osc. Inter Back Polarity pass Polarity Reverse Purge Purge Purge Dwell Osc. Speed. Pos. Amp. Shield Weld Time Time Current **Total Gas** Gas1/Gas2 Pressure Freq. Flow Temp Time Flow Flow 1ST (PEN) 19 60 4 100 100 N/A N/A N/A N/A N/A N/A N/A 72 N/A 2ND 100 100 72 19 4 60 N/A N/A N/A N/A N/A N/A

1ST (PEN) Electron D T	de Configuration 1	Weldend		30	
l	$_{\rm c} \rightarrow \mid \stackrel{\rm T}{\leftarrow}$	ground flat	C:	N/A 0.012 0.156	Joint Configuration 1 Square butt Joint
2ND Electron	de Configuration 1 C C C C C C C C C C C C C	Weldend groundflat	B: C:	30 N/A 0.012 0.156	Square out John

Electrode Configuration 1

FH25 Wold Data Tracoability

#	18RP	6		EH	25	Weld	d Dat	a T	rac	ea	bilit	y		Pa	age 1 of	1
	LASSIFIC		DEVEL	OPMEN	Т		Weldir	ng Data	a							
WELD	ED	SPLIT		ELD TY		REPAIR A B		PL	ANISI	4	WEI	LDER		DER'S OG ID	INIT	IAL WELD
F01	7	N/A		INITIAL	-	0 0	0		N/A		MEI	SON				9/23/98
	PI	ROGRAM			WE	LD PROC	CESS	WELD	ING I	POSIT	ION	BUILDIN	IG NO		ELD TURE	WELD STATION
	Al-Li	Alternate Fi	ller			VPPA		١	/ERT	ICAL		471	1		2	2
MAT	L TYPE	MAT	L THICK!	NESS	N	IATL MA	NF	LI	EFT F	PIECE		RIGHT	PIECE		MAT	L S/N
2	2195		0.2			RMC		0	371B	00219		0371B0	00226		٨	I/A
TORG	CH TYPE	TORG	H LEAD A	ANGLE	SHIE	ELD CUP	TYPE	W	IRE A	LLOY	,	WIRE HE	AT LOT	г	WIRE	MFG
HSE	EC300A		3		HS	EC REGL	JLAR		#1	8		7221	8-S		R	МС
ELEC	T. TYPE		ACKPURO S1/GAS2		BACI	K PURGE	TYPE	POV	VER S	SUPPL	_Y	TRAILING TYF		D TF		S SHIELD AS
2% 7	Thoriated		HELIUM		TF	RAVEL SH	HOE		VP3	00		N/A	4		N	I/A
PREWE	LD PANEL	CLEANIN	G: Solvent	wipe, file	abuttir	ng edges,	scrape top	/botton	n adja	cent la	nd surfa	ces, tack				
COMME	NTS:								TE	MPER.	ATURE		72	HUMIE	YTIC	
Weld Pass	Weld Schedule	Control	on Current	Voltage	Gas Pres.	Flow	Flow	Wire Rate	Trav Rate	:	Plasma Gas	Shield Gas	Dia.	Orifice Size	Torch Stand Off	Set Back
			100	18.4	13.8	3.4	80	20	9.7		GON	HELIUM	0.063	0.125	0.2	0.045
2ND	ALTFW18	AVC	100	18.4	6	1.8	80	25	8.8	AR	GON	HELIUM	0.063	0.125	0.2	0.045
Weld Pass	Straight Polarity Time	Reverse Polarity Time	Added Reverse Current	Back Purge Total Ga Flow		rge s1/Gas2	Back Purge Pressure	Arc C Dwel	- -	rc sc. req.	Arc Osc Speed.	. Arc Osc. Pos.	Arc Osc Amp.	Shiel Flov	d pas	s Weld
1ST (PEN)	19	4	60	100	100		N/A	N/A	N	Ά	N/A	N/A	N/A	N/A	72	
2ND	19	4	60	100	100)	N/A	N/A	N	Ά	N/A	N/A	N/A	N/A	72	
Weld Pass			Elect	rode Co	nfig							Join	t Config			
1ST (PEN)	E lectrod	e Configurat	c	A B	gro	ldend Bundflat C	30 3: N/A 3: 0.012 3: 0.156		Joii	nt Co	nfigur	ation 1 Squa	re but	tt Joint		
2ND	Electrod	. Configurat	ion 1	A ←	-	А	: 30					- 1340				

B: N/A Weldend B: N/A ground flat C: 0.012

D: 0.156

#18 RP7

EH25 Weld Data Traceability

WELD	ED	SPLIT	W	IELD TY	/PE	REPA	AIR AR	REAS	PL/	ANISH	WE	LDER	WEL	DER'S	INIT	IAL WELD
PANE	LID					Α	В	С					LO	G ID		DATE
F01	8	N/A		INITIAL	L	0	0	0		N/A	PA	SEUR				9/23/98
	PI	ROGRAM			WE	LD PR	ROCE	SS	WELD	ING PO	SITION	BUILDIN	IG NO	1	ELD TURE	WELD STATION
	Al-Li A	Alternate Fille	r			VPF	PA		V	ERTICA	\L	471	1		2	2
MAT	L TYPE	MATL	ТНІСКІ	NESS	٨	/ATL I	MANE	F	LE	FT PIE	CE	RIGHT	PIECE		MAT	L S/N
2	2195		0.2			RM	IC		03	371B002	239	0371B0	00229		N	l/A
TORG	СН ТҮРЕ	TORCH	I LEAD	ANGLE	SHII	ELD C	UP T	YPE	WI	RE ALL	.OY	WIRE HE	AT LO	Г	WIRE	MFG
HSE	EC300A		3		HS	EC RE	GULA	AR		#18		7221	8-S		RI	ИС
ELEC	T. TYPE		CKPURO		BAC	K PUR	GE T	YPE	POW	ER SUI	PPLY	TRAILING TYF		D TI		S SHIELD AS
2% T	Thoriated		HELIUM		TI	RAVEL	. SHO	E		VP300		N/A	4		N	/A
PREWEL	LD PANEL	CLEANING:	Solvent	wipe, file	e abutti	ng edge	es, sc	crape top	/bottom	adjacer	nt land surf	ices, tack				
СОММЕ	NTS.									TEMP	ERATURE		72	ними	YTIO	
Zald Bass		D44	I Comment	IV-IV-	Die			lob:-14	Min							
Veld Pass		Penetration Control	Current	Voltage	Gas	na Plas		Shield Flow	Wire Rate	Travel Rate	Plasma Gas	Shield Gas		Orifice Size	Torch Stand	
	Weld	Control	Current	Voltage			w		1	Travel	Plasma		s Wire	Orifice	Torch	
ST (PEN)	Weld Schedule	Control			Gas Pres.	Flo	w	Flow	Rate	Travel Rate	Plasma Gas	Shield Ga	s Wire Dia.	Orifice Size	Torch Stand Off	Set Back
Veld Pass ST (PEN) ND Veld Pass	Weld Schedule ALTFW18 ALTFW	AVC AVC Reverse Polarity	122	20.5 18.6 Back Purge Total G	Gas Pres. 13.3 5.9 Ba Pu as Ga	3.4 1.8 1.8 1.8 1.8 1.8 1.8 1.8	W Ba	Flow 80	20 25	Travel Rate 9.8 8.8	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM C. Arc Osc.	s Wire Dia. 0.063 0.063	Orifice Size 0.125 0.125	Torch Stand Off 0.2 0.2 Integral Integr	0.045 0.045 Manual Weld
ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity	AVC AVC Reverse Polarity	122 100 Added Reverse Current	20.5 18.6 Back Purge	Gas Pres. 13.3 5.9 Ba Pu as Ga	3.4 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	Ba Pi	80 80 ack urge	Rate 20 25 Arc O	Travel Rate 9.8 8.8 sc. Arc Osc.	Plasma Gas ARGON ARGON Arc Os Speed	Shield Gas HELIUM HELIUM c. Arc Osc.	s Wire Dia. 0.063 0.063 Arc Ose	Orifice Size 0.125 0.125	Torch Stand Off 0.2 0.2 Integral Integr	Set Back 0.045 0.045 Manual s Weld
ST (PEN) ND Yeld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current	20.5 18.6 Back Purge Total G	Gas Pres. 13.3 5.9 Ba Pu as Ga	3.4 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	Ba Pu s2 Pi	80 80 ack urge ressure	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM c. Arc Osc. Pos.	s Wire Dia. 0.063 0.063 Arc Osc Amp.	Orifice Size 0.125 0.125 c. Traili Shie Flot	Torch Stand Off 0.2 0.2 linteged w Terr	0.045 0.045 Manual Weld
ST (PEN) ND Yeld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19	AVC AVC Reverse Polarity Time	122 100 Added Reverse Current	20.5 18.6 Back Purge Total G Flow	Gas Pres. 13.3 5.9 Ba Pu as Ga Flo	3.4 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	Ba Pu s2 Pi	80 80 ack urge ressure	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM c. Arc Osc. Pos. N/A N/A	s Wire Dia. 0.063 0.063 Arc Osc Amp.	Orifice Size 0.125 0.125 c. Traili Shie Flow	Torch Stand Off 0.2 0.2 0.2 Integral Integral Pass W Term 72	Set Back 0.045 0.045 Manual s Weld
ST (PEN) ND eld Pass ST (PEN) ND	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19	AVC AVC Reverse Polarity Time	Added Reverse Current	20.5 18.6 Back Purge Total G Flow 100	Gas Pres. 13.3 5.9 Ba Pu as Ga Flo 100	3.4 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	Ba Pt Pt N/ N/ A: B: C:	80 80 80 ack urge ressure /A /A 30 N/A 0.012	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq N/A	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM c. Arc Osc. Pos. N/A N/A Joint	s Wire Dia. 0.063 0.063 Arc Osc Amp. N/A N/A	Orifice Size 0.125 0.125 c. Traili Shie Flow N/A	Torch Stand Off 0.2 0.2 Ing Integral Pas w Terr 72 72	Set Back 0.045 0.045 Manual Weld
ST (PEN) Veld Pass ST (PEN) ND Veld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19 19	AVC AVC Reverse Polarity Time 4 6 4 6	Added Reverse Current	20.5 18.6 Back Purge Total G. Flow 100 100	Gas Pres. 13.3 5.9 Ba Pu as Ga Flo 100	3.4 1.8 ck irge is1/Gas ow 0	Ba Pt Pt N/ N/ A: B: C:	80 80 80 ack urge ressure /A /A 30 N/A 0.012 0.156	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq N/A	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM c. Arc Osc. Pos. N/A N/A Joint	s Wire Dia. 0.063 0.063 Arc Osc Amp. N/A N/A	Orifice Size 0.125 0.125 c. Traili Shie Flow	Torch Stand Off 0.2 0.2 Ing Integral Pas w Terr 72 72	Set Back 0.045 0.045 Manual s Weld
ST (PEN) ND /eld Pass	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19 19 Electrode	AVC AVC Reverse Polarity Time 4 6	Added Reverse Current	20.5 18.6 Back Purge Total G: Flow 100 100	Gas Pres. 13.3 5.9 Ba Pu as Ga 100 100 nfig	3.4 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	Bar Prepare Prepare	80 80 80 ack urge ressure /A /A 30 N/A 0.012 0.156	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq N/A	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM c. Arc Osc. Pos. N/A N/A Joint	s Wire Dia. 0.063 0.063 Arc Osc Amp. N/A N/A	Orifice Size 0.125 0.125 c. Traili Shie Flow N/A	Torch Stand Off 0.2 0.2 Ing Integral Pas w Terr 72 72	Set Back 0.045 0.045 Manual Weld
ST (PEN) Veld Pass ST (PEN) ND Veld Pass ST (PEN)	Weld Schedule ALTFW18 ALTFW Straight Polarity Time 19 19 Electrode	AVC AVC Reverse Polarity Time 4 6 4 6	Added Reverse Current	20.5 18.6 Back Purge Total G. Flow 100 100	Gas Pres. 13.3 5.9 Ba Pu as Ga Fic 100 nfig	3.4 1.8 ck irge is1/Gas ow 0	Ba Pr Pr N/ N/ N/ A: B: C: B: C: C:	80 80 80 ack urge ressure /A /A 30 N/A 0.012 0.156 30	20 25 Arc O Dwell	Travel Rate 9.8 8.8 sc. Arc Osc. Freq N/A	Plasma Gas ARGON ARGON Arc Os Speed	HELIUM HELIUM c. Arc Osc. Pos. N/A N/A Joint	s Wire Dia. 0.063 0.063 Arc Osc Amp. N/A N/A	Orifice Size 0.125 0.125 c. Traili Shie Flow N/A	Torch Stand Off 0.2 0.2 Ing Integral Pas w Terr 72 72	Set Back 0.045 0.045 Manual s Weld



EH23 Weld Panel Traceability

Date Entered	
Date Welded	10-12-96

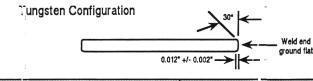
Plasma Welding Data

Weld panel I	D Program	Code I	Matl Type		Matl. Heat Lot #		Matl. Manufacturer		Mat	Matl. Thickness		Mati. Seriai#		Welding Process (dc-,dc+,vppa)	
15-A	F/Wii	re 2	195-F	RT70	934T		R	MC	().320)"	14	\1-4	VPPA	
Operator	Electrode Type	Welding To		iding Torc hield Cup		Forch entation	Weldi Posit		Back Pu Gas Ty		Plasma Typ		Shield Ga Type	s Trailing Shield Gas Type	
BJORK.	2% THOR.	B&B		STD.	3°	LEAD	VEF	RT.	HELIU	JM	ARG	DИ	HELIUN	/I n/a	
Bullding#	Power Supply	y Weld Fi	xture	Weld St	ation	Back P Typ	000001000000000000000000000000000000	Filler Ty		************	ller Wire eat Lot#	****	Filler Wire anufacturer	Trailing Shield Type	
#4705	HOBART	RCKT	DYN.	#3		OPEN F BACKSH		Che	m 15		n/a		RMC	n/a	
	Ele	ctrode Conf	guratio	in .						,	oint Con	igural	tion		
		*See Bel	ow	Ť						S	QUARE	BU	гт		

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass						-				
First Pass	200	21.0	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	18.5	80	2.0		.063	60.0	7.0	RT	.156
3rd Pass				5						
4th Pass										
5th Pass				•						
6th Pass										
7th Pass				5						
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current				Arc Oscill. Amplitude
Tack Pass												
First Pass	.188	.045	200	0 -	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				h ks								
4th Pass												:
5th Pass								:				
6th Pass				1								
7th Pass												
8th Pass								•				

Comments:



Plasma Gas Bottle Number	Torch Shield	Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
,				70F	75%



EH23 Weld Panel Traceability

Date Entered	
Date Welded	10-12-96

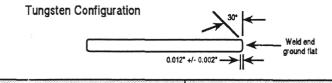
Plasma Welding Data

Weld panel I	D Program	Code	Matl Type		Matl Heat Lot #		Mati. Manufacturer		er Mat	Mati. Thickness		Mati. Serial#		Welding Process (dc-,dc+,vppa)	
15-B	F/Wi	re 2	2195-RT70		934T649A -1 A1		RMC			0.320"		1A1-2		VPPA	
Operator	Electrode Type	Welding To		elding Torch Shield Cup		orch intation	Weldi Posit		Back Pt Gas T		Plasma Typ		Shield Ga Type	s Trailing Shield Gas Type	
BJORK.	2% THOR.	B&B		STD.	3° LEAD		VERT.		HELIUM		ARGON		HELIUN	n/a	
Building#	Power Suppl	Weld Fixture		Weld Station		Back Purge Type						Filler Wire lanufacturer	Trailing Shield Type		
#4705	HOBART	RCKT	RCKTDYN.			OPEN FACE				n/a		RMC	n/a		
	Ele	ctrode Con	figurati	ion							loint Con	figura	tion		
*See Below								SQUARE BUTT							
Veld Passes		Welding Voltage	Shield Flow (S		sma Ga w Rate			Filler V Size D		ller W ate (IP		iel Rai IPM)	te Interpa		

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas ,Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass						-				
First Pass	200	21.2	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	18.6	80	2.0		.063	56.0	7.0	RT	.156
3rd Pass										
4th Pass										
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size					Strght, Pol. Time (ms)				Arc Oscill. Frequency		
Tack Pass								7				
First Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass				;								
5th Pass				*5								
6th Pass				,.				t.				
7th Pass								-				
8th Pass												

Comments:



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
		-	70F	75%
		·		



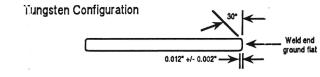
Date Entered	
Date Welded	10-9-96

Plasma Welding Data

Weld panel I	Yeld panel ID Program Code		Matl Type Matl. He		Matl. Heat Lot #		Mati. Manufacturer		Matt. Thickness		. Serial#	Welding Process (dc-,dc+,vppa)	
16-A	16-A F/Wire 2195-		95-RT70	934T649A -2B1		RMC		0.320"		2B1-5		VPPA	
Operator	Electrode Type	Welding Torch	Welding T Shield C		Forch entation	Weldi Posit		Back Pur Gas Typ		na Gas ype	Shield Gas	s Trailing Shield Gas Type	
BJORK.	2% THOR. B&B STD.		- 3°	3° LEAD		T.	HELIUM		GON	HELIUN	/I n/a		
Building#	Power Supply	Weld Fixtu	ıre Weld	Station	Back F		Filler Typ		Filler Wir Heat Lot		Filler Wire anufacturer	Trailing Shield Type	
#4705	HOBART	RCKTD	YN.	#3		FACED HIELDER	Cher	n 16	n/a		RMC	n/a	
	Elec	trode Configu	ıration					,	Joint C	onfigura	tion		
		*See Belo	w	i i					SQUAF	RE BU	тт		

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia	Filler Wire Rate (IPM)	Travel Rate (IPM)	interpass Temperature	Orifice Size
Tack Pass)		}				
First Pass	200	20.7	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	18.0	80	2.0		.063	57.0	7.0	RT	.156
3rd Pass				·'						
4th Pass				t,e		**				
5th Pass										
6th Pass				-		,				
7th Pass				:						
8th Pass										

Weld Passes	Electrode Size		Back Purge Gas Flow							Arc Oscill. Frequency		
Tack Pass												
First Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	. 60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass								÷				
5th Pass								.4				
6th Pass				i i				-				
7th Pass				Ĭ				:				
8th Pass				,								



Plasma: Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
:	i i	·	70F	75%
	•			



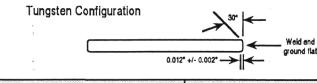
Date Entered	
Date Welded	10-9-96

Plasma Welding Data

Weld panel I	Weld panel ID Program Code		Matt	Type Matt. Heat Lot #			at Lot #	Matl. Manufacturer		Mati.	Matl. Thickness		Matt. Seria⊯		Welding Process (dc-,dc+,vppa)
16-B	16-B F/Wire		2195	195-RT70		934T649A -1A1		RMC		0	0.320"		1 A1- 5		VPPA
Operator	Electrode Type											a Gas Shield Ga		s Trailing Shield Gas Type	
BJORK.	2% THOR.	B&E	В	STI	D.	3° I	LEAD	VER	ERT. HELIUM		ARGON		HELIUN	/I n/a	
Building#	uilding# Power Supply Weld Fixture We		Weld Station Back F									Trailing Shield Type			
#4705	HOBAR	r RCI	KTDY	N.	#3		OPEN F BACKSH		Che	m 16		n/a		RMC	n/a
	Ele	ctrode C	onfigur	ation							,	J o int Con	ligura	tion	
	*See Below										S	QUARE	BU	тт	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass	***************************************			1	'					
First Pass	200	21.0	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	18.0	80	2.0		.063	59.0	7.0	RT	.156
3rd Pass				,						
4th Pass										
5th Pass										
6th Pass						,				
7th Pass						-				
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		
Tack Pass												
First Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				*** I								
4th Pass												
5th Pass				,								
6th Pass								-				
7th Pass				1								
8th Pass								:				



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%
~				



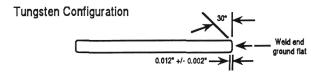
Date Entered	
Date Welded	10-8-96

Plasma Welding Data

Weld panel			Mat	att Type Matt. Heat Lot #		at Lot#	Mati. Manufacturer		r Mati	Matl. Thickness		Mati. Serial≢		Welding Process (dc-,dc+,vppa)	
17 - A			219	5-R	934T649A -1A1			RMC		C	0.320"		1 A 1-1		VPPA
Operator	Electrode Type			***************************************	Welding Back Pu Position Gas T)					Shield Ga Type	s Trailing Shield Gas Type				
BJORK.	2% THOR.	OR. B&B		STD.		3° LEAD		VEF	RT. HELIU		UM ARG		ON HELIU		/I n/a
Building#	Power Supp	y We	ld Fixtu	e	Weld S	itation	Back P Typ			r wire ype		ler Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBAR	r RC	KTDY	'N.	#:	3	OPEN F BACKSF		Che	em 17		n/a		RMC	n/a
	Ele	ctrode (Configu	atio	n						,	loint Con	figurat	iion	
1	*See Below										S	QUARE	BUT	ГТ	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass		***************************************		i		Ŷ				
First Pass	200	21.8	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	18.6	80	2.0		.063	50.0	7.0	RT	.156
3rd Pass				1.						
4th Pass										
5th Pass										
6th Pass										
7th Pass				:		,				
8th Pass										

Weld Passes	Electrode Size		Back Purge Gas Flow							Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.188	.045	200	0 .	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				1				-				
4th Pass				T.				· ·				
5th Pass								1				
6th Pass												
7th Pass												
8th Pass								,				



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
:			70F	75%
		·		



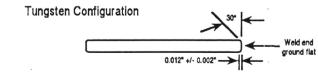
Date Entered	
Date Welded	10-8-96

Plasma Welding Data

D Program	Code Ma	tt Typ	e M	lati. He	at Lot #			Mati	. Thic	kness			Welding Process (dc-,dc+,vppa)
F/Wi	re 21	95-R7	Г70			RI	MC	C	.320)"	1.4	1-3	VPPA
Electrode Welding Torch Shield Cup C											Trailing Shield Gas Type		
2% THOR.	В&В	S	STD.	3° I	LEAD	VER	RT.	HELIL	JM	ARG	ОИ	HELIUN	n/a
Power Suppl	y Weld Fixt	ле	Weld Sta	tion									Trailing Shield Type
HOBART	RCKTD	YN.	#3				Chem 17		n/a			RMC	n/a
Electrode Configuration									,	loint Cor	figura	tion	1
	*See Belo	w	1						S	QUARE	BU	тт	
	F/Wi Electrode Type 2% THOR. Power Suppl	F/Wire 219 Electrode Type Welding Torch 2% THOR. B&B Power Supply Weld Fixth HOBART RCKTD Electrode Conflight	F/Wire 2195-RT Electrode Type Welding Torch Shi 2% THOR. B&B S Power Supply Weld Fixture HOBART RCKTDYN.	F/Wire 2195-RT70 Electrode Type Welding Torch Shield Cup 2% THOR. B&B STD. Power Supply Weld Fixture Weld State HOBART RCKTDYN. #3 Electrode Configuration	F/Wire 2195-RT70 934T6 -1A Electrode Type Welding Torch Shield Cup Orie 2% THOR. B&B STD. 3° I Power Supply Weld Fixture Weld Station HOBART RCKTDYN. #3 Electrode Configuration	F/Wire 2195-RT70 934T649A -1A1 Electrode Type Welding Torch Shield Cup Torch Orientation 2% THOR. B&B STD. 3° LEAD Power Supply Weld Fixture Weld Station Type HOBART RCKTDYN. #3 OPEN F BACKSH	F/Wire 2195-RT70 934T649A -1A1 RI Electrode Type Welding Torch Shield Cup Orientation Posit 2% THOR. B&B STD. 3° LEAD VER Power Supply Weld Fixture Weld Station Back Purge Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Electrode Configuration	F/Wire 2195-RT70 934T649A RMC Electrode Type Welding Torch Shield Cup Orientation Position 2% THOR. B&B STD. 3° LEAD VERT. Power Supply Weld Fixture Weld Station Back Purge Type Type Type Type Type Type Type Typ	F/Wire 2195-RT70 934T649A RMC C Electrode Type Welding Torch Shield Cup Orientation Position Gas Ty 2% THOR. B&B STD. 3° LEAD VERT. HELIL Power Supply Weld Fixture Weld Station Back Purge Type Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 17 Electrode Configuration	F/Wire 2195-RT70 934T649A RMC 0.320 Electrode Type Welding Torch Shield Cup Orientation Position Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM Power Supply Weld Fixture Weld Station Back Purge Type Filler wire Type H HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 17	F/Wire 2195-RT70 934T649A RMC 0.320" Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Type Power Supply Weld Fixture Weld Station Back Purge Type Heat Lot# HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 17 n/a Electrode Configuration Joint Con	F/Wire 2195-RT70 934T649A RMC 0.320" 1A Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM ARGON Power Supply Weld Fixture Weld Station Back Purge Type Filler Wire Heat Lot# Melding Type Type Heat Lot# Melding Type Type Type Type Heat Lot# Melding Type Type Type Heat Lot# Melding Type Type Heat Lot# Meld Station Department Type Type Heat Lot# Melding Type Type Type Type Heat Lot# Melding Type Type Type Type Type Type Type Type	F/Wire 2195-RT70 934T649A -1A1 RMC 0.320" 1A1-3 Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Gas Shield Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM ARGON HELIUM Power Supply Weld Fixture Weld Station Type Type Filler Wire Type Heat Lot# Manufacturer HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 17 n/a RMC Electrode Configuration Joint Configuration

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass										
First Pass	200	21.6	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	18.3	80	2.0		.063	50.0	7.0	RT	.156
3rd Pass				-5						
4th Pass				1						
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght. Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current	Arc Oscill. Dwell	Arc Oscill. Frequency	Arc Oscill. Position	Arc Oscill. Amplitude
Tack Pass												
First Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				ŧ				V-				
4th Pass												
5th Pass								*1				
6th Pass				,								
7th Pass				*								
8th Pass				:								



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
		·	70F	75%
	,			



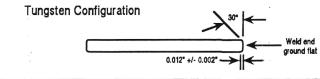
Date Entered	
Date Welded	10-8-96

Plasma Welding Data

Weld panel			Matt	Туре	e Matl. Heat Lot #		t Lot#	Mati. Manufacturer		. Mati	. Thick	ness	MatL Serial#		Welding Process (dc-,dc+,vppa)
18-A	F/Wii	re	2195-RT70		934T649A -1A1			RMC		C	0.320"		1A1-8		VPPA
Operator			Welding T Shield C				Weldi Posit		Back Pu Gas Ty		Plasma Typ		Shield Ga Type	s Trailing Shield Gas Type	
BJORK.	2% THOR.	B&	В	STD.		3° LEAD		VERT.		HELIU	HELIUM		N	HELIUM	/I n/a
Building#	Power Supply	y Wel	d Fixtur	e Weld	Stat	ion	Back Pr			wire pe		r Wire at Lot#	****	Filler Wire anufacturer	Trailing Shield Type
#4705	HOBART	RC	KTDY	N.	#3		OPEN F BACKSH		Che	m 18	n	ı/a		RMC	n/a
	Ele	ctrode C	Configur	ation							Jo	int Con	igura	lion	1
		*See I	Below	•	ż						SQ	UARE	BU	тт	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				Ì						
First Pass	200	22.0	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	19.0	80	2.0		.063	60.0	7.0	RT	.156
3rd Pass										
4th Pass				į						
5th Pass						1,				
6th Pass				+		:				
7th Pass										
8th Pass										

Weld Passes	Electrode Size					Strght. Pol. Time (ms)				Arc Oscill. Frequency		
Tack Pass												
First Pass	.188	.045	200	0 /	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass								-				
4th Pass				1				-L				
5th Pass				:				•				
6th Pass				-				1				
7th Pass				,								
8th Pass												



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



Date Entered	
Date Welded	10-8-96

Plasma Welding Data

Weld panel	D Program	Code M	atl Ty	/pe M	lati. He	at Lot #		atl. facture	Mat	l. Thic	kness	Matl. Serial#		Welding Process (dc-,dc+,vppa)
18-B	F/Wi	re 21	95-F	RT70	934T6 -2 E		R	мс	0	0.320)"	28	31-5	VPPA
Operator	Electrode Type	Welding Tord		lding Torch hield Cup		orch entation	Weldi Posit		Back Pu Gas Ty		Plasma Typ		Shield Ga Type	s Trailing Shield Gas Type
BJORK.	2% THOR.	B&B		STD.	3° I	LEAD	VEF	RT.	HELIL	JM	ARG	ОИ	HELIUN	/I n/a
Building#	Power Suppl	y Weld Fix	ture	Weld Sta	tion	Back P Typ			r wire /pe		ler Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBART	RCKT	YN.	#3		OPEN F BACKSF	ACED HELDER	Che	m 18		n/a		RMC	n/a
	Ele	ctrode Config	uratio	n							l o înt Con	figura	tion	
i,	*See Below									S	QUARE	BU	тт	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass						1				
First Pass	200	21.6	80	5.0		.063	25.0	11.0	RT	.156
2nd Pass	145	18.7	80	2.0		.063	55.0	7.0	RT	.156
3rd Pass										
4th Pass				.'						
5th Pass										
6th Pass										
7th Pass										·
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current	Arc Oscill. Dwell	Arc Oscill. Frequency	Arc Oscill. Position	Arc Oscili. Amplitude
Tack Pass												
First Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.188	.045	200	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass												
5th Pass				is.				7				
6th Pass								-				
7th Pass								Ĭ.				
8th Pass												

Tungsten Configuration Weld end ground flat Plasma Gas Bottle Number Torch Shiel-3 Gas Bottle Number Back Purge Gas Bottle Number Room Temp Humidity 70F 75%



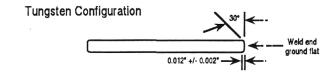
Date Entered	
Date Welded	9-11-96

Plasma Welding Data

Weld panel I	D Program	Code Ma	tl Ty	pe M	ati. He	at Lot#		ati. facturei	. Mat	. Thic	kness	Mati. Serial#		Welding Process (dc-,dc+,vppa)
16-R01	F/Wii	re 219	95-T	8	950M	024A	Ri	MC).200	ס"			VPPA
Operator	Electrode Type	Welding Torch		ding Torch nield Cup		Forch entation	Weldi Posit		Back Pu Gas Ty		Plasma Typ		Shield Ga Type	s Trailing Shield Gas Type
BJORK.	2% THOR.	B&B	,	STD.	3°∣	LEAD	VER	T.	HELIU	JM	ARG	N	HELIUN	n/a
Building#	Power Suppl	y Weld Fixtu	ırė	Weld Sta	tion	Back P Typ	***************************************		vire pe	************	ller Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBART	RCKTD	YN.	#3		OPEN F BACKSH		Che	m 16		n/a		RMC	n/a
,	Ele	ctrode Configu	ratio	n						ı.	loint Con	igura	lion	1
	*See Below							SQUARE BUTT						

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				-						
First Pass	122	21.5	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	25	8.8	RT	.125
3rd Pass										
4th Pass										
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		Arc Oscill Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass												
5th Pass												
6th Pass												
7th Pass												
8th Pass												



Flusma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



Date Entered	
Date Welded	9-11-96

Plasma Welding Data

Weld panel I	D Program	Code	Matl. Ty	ype M	lati. He	at Lot#		ati. facture	er Ma	tl. Thic	kness	Matt. Serial#		Welding Process (dc-,dc+,vppa)
16-R02	2 F/Wi	re 2	195-1	Г8	950 M (024A	R	МС		0.20	סיי			VPPA
Operator	Electrode Type	Welding To		lding Torch hield Cup		orch entation	Weldi Posit		Back P Gas T		Plasma Typ		Shield Ga Type	s Trailing Shield Gas Type
BJORK.	2% THOR.	B&B		STD.	3° I	LEAD	VEF	ìT.	HELI	UM	ARG	ON	HELIUN	n/a
Building#	Power Supp	ly Weld F	xture	Weld Sta	ition	Back P Typ			er wire Type	~ ~~~	iller Wire leat Lot#			Trailing Shield Type
#4705	HOBAR	RCKT	DYN.	#3		OPEN F BACKSH		Ch	em 16		n/a		RMC	n/a
	Ele	ctrode Conf	iguratio	on						,	Joint Cor	figura	tion	
		*See Bel	ow							S	QUAR	BU	тт	
Weld Passes	Welding Current		Shield low (S		ma Ga w Rate			Filler V Size D		ller W late (IF		vel Rat (IPM)	te Interpa	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass										
First Pass	122	21.5	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	25	8.8	RT	.125
3rd Pass										
4th Pass										
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass								:				
5th Pass												
6th Pass												
7th Pass												
8th Pass												

Tungsten Configuration Weld end ground flat Plasma Gas Bottle Number Torch Shield Gas Bottle Number Back Purge Gas Bottle Number Room Temp Humidity 70F 75%



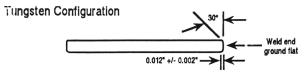
Date Entered	
Date Welded	9-11-96

Plasma Welding Data

		5-T8	950M	0244	-						
ectrode Welding				950M024A				00"			VPPA
Туре	elding Torch	Welding To Shield Cu		orch entation	Weldi Positi	· •	Back Purge Gas Type	Plasma Typ		Shield Gas Type	Trailing Shield Gas Type
THOR.	B&B	STD.	3° I	LEAD	VER	т.	HELIUM	ARG	ОИ	HELIUM	n/a
wer Supply	Weld Fixtur	re Weld	Station					Filler Wire Heat Lot#			Trailing Shield Type
OBART	RCKTDY	'N. #	:3			Cher	n 16	n/a		RMC	n/a
Electr	rode Configur	ation					1	Joint Cor	figurat	tion	1
*;	See Below						;	SQUARE	BUT	ГТ	
	ver Supply OBART Elect	ver Supply Weld Fixtur OBART RCKTDY Electrode Configur *See Below	ver Supply Weld Fixture Weld S OBART RCKTDYN. # Electrode Configuration *See Below	ver Supply Weld Fixture Weld Station OBART RCKTDYN. #3 Electrode Configuration *See Below	ver Supply Weld Fixture Weld Station Back F Typ OBART RCKTDYN. #3 Electrode Configuration	ver Supply Weld Fixture Weld Station Back Purge Type OBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Electrode Configuration	wer Supply Weld Fixture Weld Station Back Purge Type Type OBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Cher Electrode Configuration	ver Supply Weld Fixture Weld Station Back Purge Type Type OBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 16 Electrode Configuration	ver Supply Weld Fixture Weld Station Back Purge Type Filler Wire Heat Lot# OBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 16 n/a Electrode Configuration Joint Cor	ver Supply Weld Fixture Weld Station Back Purge Type Filler wire Heat Lot# M OBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 16 n/a Electrode Configuration Joint Configuration	ver Supply Weld Fixture Weld Station Back Purge Type Filler Wire Heat Lot# Manufacturer OBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 16 n/a RMC Electrode Configuration Joint Configuration

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				1						
First Pass	116	24.0	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	25	8.8	RT	.125
3rd Pass										
4th Pass										
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size		Back Purge Gas Flow							Arc Oscill. Frequency		
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass								1				
5th Pass								Î				
6th Pass												
7th Pass				,				1				
8th Pass												



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
·			70F	75%



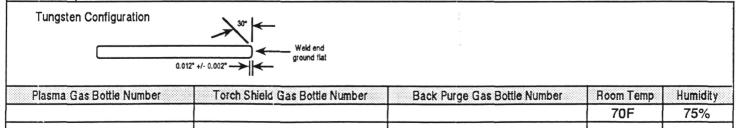
Date Entered	
Date Welded	9-11-96

Plasma Welding Data

Weld panel I	D Program	ram Code MatL Ty		Туре	Matt. Heat Lot #		Matl. Manufacturer		r N	Matl. Thickness		Matl. Serial#		Welding Process (dc-,dc+,vppa)	
16-R04	F/Wi	re	2195	-T8	950M0	24 A	F	RMC		0.200	0.200"			,	VPPA
Operator	Electrode Type	Welding 1		elding Tord Shield Cup		rch tation	Wek Pos	ding Ition		Purge Type	Plasma Tyj		Shield Ga Type	s T	ralling Shield Gas Type
BJORK.	2% THOR.	B&E	3	STD.	3° L	EAD	VE	RT.	HEI	LIUM	ARG	ОИ	HELIUN	и	n/a
Building#	Power Supp	y Weld	Fixture	Weld SI	ation	Back P			r wire ype	333333 33333333333	er Wire at Lot#	********	Filler Wire Manufacturer		ailing Shield Type
#4705	HOBAR	r RCK	(TDYN	N. #3	3	OPEN F	FACED HIELDER	Che	em 16	6	n/a		RMC		n/a
	Electrode Configuration							1		Je	int Co	nfigurati	on		
		*See B	Below							sc	UAR	E BUT	Т		
Weld Passes	Welding Current	Welding Voltage			isma Gas ow Rate		a Gas sure	Filler W Size D		Filler Wir Rate (IPN		ivel Rate (IPM)	Interpa Tempera		Orifice Size
Tack Pass															

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	interpass Temperature	Orifice Size
Tack Pass										
First Pass	116	21.9	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	30	8.8	RT	.125
3rd Pass										
4th Pass										
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght. Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current	Arc Oscill. Dwell	Arc Oscill. Frequency	Arc Oscill. Position	Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass				1								
5th Pass				:				i				
6th Pass												,
7th Pass								-				
8th Pass												





Date Entered	
Date Welded	9-14-96

Plasma Welding Data

Weld pane	el ID I	Program (Code	Matt	Туре	Ma	atl. Heat	Lot#		Mati. nufacturer	1	Matl. Thi	cknes	s	Matl. S	erial#		Iding Process c-,dc+,vppa)
16-R	05	F/Wir	е	2195	5-T8	9	50M02	4 A	ı	RMC		0.20	0''	-			-	VPPA
Operator		trode ype	Welding	Torch	Welding T Shield C	orch up	Tor Orlent			ding ition		k Purge s Type	Pla	sma C Type	ias :	Shleid Ty		Frailing Shield Gas Type
BJORK	. 2% T	HOR.	B&	В	STD.		3° LE	AD	VE	RT.	HE	LIUM	AF	RGO	N	HEL	.IUM	n/a
Building#	Powe	er Supply	Wel	d Fixtur	e Weld	d Stat	ion	Back P Typ		Filler Ty			iller W Heat L			er W ufact		railing Shield Type
#4705	нс	BART	RC	KTDY	N.	#3		OPEN I BACKSI	ACED HELDER	Che	m 1	6	n/a	0000000000	F	RMC	;	n/a
	1	Elec	trode C	onfigur	ation					1			Joint	Confi	guratio	1	1	
			*See I	Below								S	QUA	RE	витт	•		
Weld Passe	s Weldir Curre		/elding /oltage		eld Gas (SCFH)		na Gas v Rate	Plasma Pres	a Gas sure	Filler Wi Size Dia		Filler W Rate (I			Rate		erpass perature	Orifice Size
Tack Pass											1							
First Pass	116		21.5		80		.5			.063	١,	20		9.			RT	.125
2nd Pass	100		19.8	8	80	2	.0			.063		20	_	8	.8		RT	.125
3rd Pass													_			├-		_
4th Pass											-					├-		<u> </u>
oth Pass oth Pass	-			+-									\dashv			-		
7th Pass	-			+-							\dashv					\vdash		
8th Pass	+			+						<u> </u>	\dashv		-			\vdash		-
DUI F & 55										<u> </u>						<u> </u>		
Weld Passes	Electrode Size	Electro Set Ba			Back Pur Gas Pre		all. Shid. Ias Flow	Strgh Time		Rev. Pol. Time (ms)		ld. Rev. Jurrent	Arc C Dw		Arc O Freque		Arc Osc Positio	
Tack Pass																		
irst Pass	.156	.045		100	0		n/a	19		4		60	n/	а	n/a	3	n/a	n/a
2nd Pass	.156	.045		100	0		n/a	19	9	4		60	n/	а	n/a	3	n/a	n/a
Brd Pass						;												
Ith Pass											1							
oth Pass						-					!							
Sth Pass			\bot								3							
7th Pass						1					1							
8th Pass		1	1		ı			1	- 1		1		1		I	1		

Tungsten Configuration Weld end ground flat Plasma Gas Bottle Number Torch Shield Gas Bottle Number Back Purge Gas Bottle Number Room Temp Humidity 70F 75%



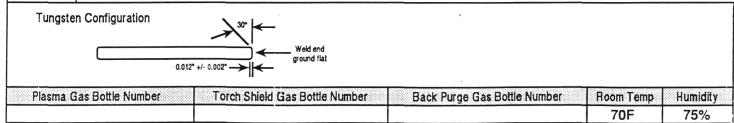
Date Entered	
Date Welded	9-14-96

Plasma Welding Data

Weld panel	D Program	Code Ma	ati. Ty	pe M	atl. He	at Lot#		ati. facture	r Mat	. Thic	kness	Mati	. Serial#	Welding Process (dc-,dc+,vppa)
16-RP	ı F/Wi	re 21	95-T	8 9	950 M (024A	R	MC	().200	סיי			VPPA
Operator	Electrode Type	Welding Torci		ding Torch nield Cup		orch entation	Weldi Posit		Back Pu Gas Ty	ck Purge Plass as Type T			Shield Ga Type	s Trailing Shield Gas Type
BJORK.	2% THOR.	B&B		STD.	3° ∣	LEAD	VEF	т.	HELIU	JM	ARG	NC	HELIUN	/I n/a
Building#	Power Suppl	y Weld Fixt	ure	Weld Sta	tion	Back P Typ			r wire ype	***********	ller Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBAR	RCKTD	YN.	#3		OPEN F BACKSH		Che	em 16		n/a		RMC	n/a
	Ele	ctrode Config	uratio	in.						,	Joint Con	ligura	lion	
		*See Belo	w							S	QUARE	BU	гт	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				:		į				
First Pass	116	21.9	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	20	8.8	RT	.125
3rd Pass				1		1				
4th Pass										
5th Pass				*						
6th Pass						'				
7th Pass										,
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght. Pol. Time (ms)	Rev. Pol. Time (ms)			Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	. 60	n/a	n/a	n/a	n/a
3rd Pass				٠.								
4th Pass								5				
5th Pass												
6th Pass												
7th Pass				1				î				
8th Pass				,				,				





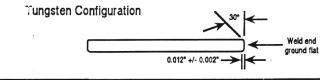
Date Entered	
Date Welded	9-14-96

Plasma Welding Data

Weld panel I	D Program	Code	Mati	Туре	Matl. He	eat Lot #	Matl. Manufacturer		Mati	Matl, Thickness		Matt. Serial#		Welding Process (dc-,dc+,vppa)
16-RP2	2 F/Wii	re	2195	5-T8	950M	024 A	R	МС	0	.200	"			VPPA
Operator	Electrode Type	- Weiding lorchi chiala		Velding To Shield Cu		orch entation	Weldi Posit		Back Pu Gas Ty		Plasma Typ		Shield Ga Type	s Trailing Shield Gas Type
BJORK.	2% THOR.	B&	В	STD.	3°	LEAD	VEF	T.	HELIU	JM	ARG	ON	HELIUN	/I n/a
Building#	Power Suppl	y Wel	d Fixture	e Weld S	Station	Back F Typ	0000010000000000000000000000000000000		r wire pe		ler Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBART	RC	KTDYI	N. #	3	OPEN I	FACED HELDER	Che	m 16		n/a		RMC	n/a
	Ele	ctrode C	onfigura	ation						J	oint Cor	figura	tion	
		*See l	Below	27			SQUARE BUTT							

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				;		;				
First Pass	116	21.5	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	20	8.8	RT	.125
3rd Pass										
4th Pass										
5th Pass										
6th Pass										
7th Pass				;		~				
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass				1				:				
5th Pass												
6th Pass								·				
7th Pass												
8th Pass												



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



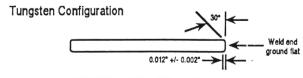
Date Entered	
Date Welded	9-14-96

Plasma Welding Data

D Program	Code M	ati. Ty	rpe M	Matl. Heat Lot #			Mati. Manufacturer		Matl. Thickness			. Serial#	Welding Process (dc-,dc+,vppa)	
B F/Wi	re 21	95-T	8	95 0M (024A	R	MC	0	.200)"			VPPA	
Electrode Type	Type Weiding Torch Shie					Welding Position				000000000000000000000000000000000000000			s Trailing Shield Gas Type	
2% THOR.	B&B		STD.	3° l	LEAD	VER	T.	HELIU	M	ARG	NC	HELIUI	M n/a	
Power Suppl	y Weld Fix	ure	Weld Sta	tion									Trailing Shield Type	
HOBART	RCKT	YN.	#3				Che	m 16		n/a		RMC	n/a	
Ele	ctrode Config	uratio	n						į	oint Con	figura	tion		
	*See Belo	w							S	QUARE	BU	тт		
	F/Wi Electrode Type 2% THOR. Power Suppl	F/Wire 21 Electrode Type Welding Torce 2% THOR. B&B Power Supply Weld Fixt HOBART RCKTD Electrode Config	F/Wire 2195-7 Electrode Type Welding Torch S 2% THOR. B&B Power Supply Weld Fixture HOBART RCKTDYN.	F/Wire 2195-T8 Electrode Type Welding Torch Shield Cup 2% THOR. B&B STD. Power Supply Weld Fixture Weld Sta HOBART RCKTDYN. #3 Electrode Configuration	F/Wire 2195-T8 950Mi Electrode Type Welding Torch Shield Cup Orie 2% THOR. B&B STD. 3° I Power Supply Weld Fixture Weld Station HOBART RCKTDYN. #3 Electrode Configuration	F/Wire 2195-T8 950M024A Electrode Type Welding Torch Shield Cup Orientation 2% THOR. B&B STD. 3° LEAD Power Supply Weld Fixture Weld Station Back P Typ HOBART RCKTDYN. #3 OPEN F BACKSF	Program Code Matt Type Matt Heat Lot # Manu B F/Wire 2195-T8 950M024A Ri Electrode Welding Torch Shield Cup Orientation Posit 2% THOR. B&B STD. 3° LEAD VER Power Supply Weld Fixture Weld Station Back Purge Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Electrode Configuration	Program Code Matt Type Matt. Heat Lot # Manufacturer B F/Wire 2195-T8 950M024A RMC Electrode Welding Torch Shield Cup Orientation Position 2% THOR. B&B STD. 3° LEAD VERT. Power Supply Weld Fixture Weld Station Back Purge Type Ty HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chei	Program Gode Matt Type Matt. Heat Lot # Manufacturer Matt. B F/Wire 2195-T8 950M024A RMC 0 Electrode Type Welding Torch Shield Cup Orientation Position Gas Tyle 2% THOR. B&B STD. 3° LEAD VERT. HELIU Power Supply Weld Fixture Weld Station Back Purge Type Filler wire Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 16	Program Code Matt. Type Matt. Heat Lot # Manufacturer Matt. Thic B F/Wire 2195-T8 950M024A RMC 0.200 Electrode Type Welding Torch Shield Cup Orientation Position Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM Power Supply Weld Fixture Weld Station Back Purge Type Filler wire Type H HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 16	Program Code Matt Type Matt. Heat Lot # Manufacturer Matt. Thickness Matt. Thicknes	Program Code Matt Type Matt. Heat Lot # Manufacturer Matt. Thickness Matt. B F/Wire 2195-T8 950M024A RMC 0.200" — Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM ARGON Power Supply Weld Fixture Weld Station Back Purge Type Filler Wire Heat Lot # M HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 16 n/a Electrode Configuration Joint Configura	Program Code Matt Type Matt. Heat Lot Manufacturer Matt. Thickness Matt. Serial Manufacturer Matt. Thickness Matt. Serial Manufacturer Matt. Thickness Matt. Serial Matt. Serial Manufacturer Matt. Thickness Matt. Serial Matt. S	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass	***************************************					i				
First Pass	116	21.5	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	20.0	80	2.0		.063	20	8.8	RT	.125
3rd Pass				:		4-				
4th Pass										,
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size		Back Purge Gas Flow					Add. Rev. Current		Arc Oscill. Frequency		
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				i								
4th Pass								ļ.				
5th Pass								:				
6th Pass				,								
7th Pass								7				
8th Pass												



Piasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



Date Entered	
Date Welded	9-14-96

Plasma Welding Data

Weld par	nel ID	Pro	gram Co	de	MatL	Туре		MatL Heal	Lot#	Ma	Mati. nufacture	r	Matl. Th	icknes	is	Matl S	erial#		elding Proces ic-,dc+,vppa)
16-F	RP4	F	-/Wire		2195	5-T8		950M0	24 A		RMC		0.20	0''	-			-	VPPA
Operator	ſ	Electro Type		lding T	orch	Velding Shield	Torc Cup	h To Orien	rch tation		lding sition		ck Purge las Type	Pla	isma C Type	ias	Shlelo Ty	i Gas pe	Trailing Shiel Gas Type
BJORK	(. 2%	6 TH	OR.	B&B		STI	D.	3° L∣	EAD	VE	RT.	Н	ELIUM	Α	RGO	N	HEL	IUM	n/a
Building	# P	ower S	Supply	Weld	Fixture	e W	eld St	ation	Back I			r wii ype		-iller \ Heat I			er Wi		railing Shield Type
#4705		нов	ART RCKTDYN. #3					3	OPEN BACKS	N FACED (SHIELDER Chem 16 n/a RMC					n/a				
		Electrode Configuration Joint Configuration																	
į			*5	ee B	elow								5	SQU/	ARE	BUTT			
Weld Pass		elding urrent	Wel Voit	ding age		ld Gas (SCFH		sma Gas ow Rate	Plasm Pres	a Gas sure	Filler W Size D		Filler V Rate (l Rate M)		erpass perature	Orifice Size
Tack Pass				************			j												
First Pass	1	16	21	.5	8	30	1	3.5			.063		20		9.	В		RT	.125
2nd Pass	1	00	19	.8	8	30		2.0			.063	1	20		8.	.8		RT	.125
3rd Pass							1					F							
4th Pass					_		-												ļ
5th Pass							_										_		
6th Pass					-		-										_		-
7th Pass	-				-		+							-			_		ļ
8th Pass									<u> </u>		<u> </u>								
Weld Passes	Electro Size		lectrode Set Back					Trail. Shlo Gas Flow			Rev. Pol. Time (ms		dd. Rev. Current			Arc Os Freque		Arc Ose Positio	
Tack Pass												I							
First Pass	.156		.045	10	00	0		n/a	1	9	4		60	n	/a	n/a	1	n/a	n/a
2nd Pass	.156		.045	10	00	0		n/a	1	9	4		60	n	/a	n/a		n/a	n/a
3rd Pass												1							
4th Pass												,							
5th Pass							- 1					1							
6th Pass									_			1							
7th Pass		\perp		_					1			1							
8th Pass		\perp																	
Comments	: 7																		
	sten Co	mělev-	otion			30° 🗲													

	Weld end ground flat	•		
Piasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



Tungsten Configuration

Plasma Gas Bottle Number

EH23 Weld Panel Traceability

Date Entered	
Date Welded	9-14-96

Room Temp

70F

Back Purge Gas Bottle Number

Humidity

75%

Plasma Welding Data

Weld par	nel ID	Program	Code	e Ma	L Typ	e	Matl. Heat	Lot#		Matl. nufacturer		Matl. Th	icknes	s	Matl S	erial#		lding Process c-,dc+,vppa)
16-F	RP5	F/Wi	re	219	5-T8	3	950M02	24 A		RMC		0.20	0''	T-			-	VPPA
Operator		trode ype	Weld	ling Torch	Weld Shi	ing Tor eld Cu	rch Toi o Orien			ding sition		k Purge as Type	Pla	isma (Type	ias :	Shield Typ		Trailing Shiek Gas Type
BJORK	(. 2% T	HOR.	E	3&B	S	TD.	3° LE	EAD	VE	RT.	HE	LIUM	Α	RGO	N	HEL	.IUM	n/a
Building	# Pow	er Supp	y \	Weld Fixtu	re	Weld S	Station	Back F		Filler Ty	wire pe		Filler V Heat L			er Wi ufact		railing Shield Type
#4705	н)BAR	Г	RCKTD	'N.	#	:3	OPEN I	FACED HIELDEF	Che	m 1	16	n/a		F	RMC	;	n/a
		Ele	ctrod	le Configu	ration	ı	l.					l	Joint	Confi	guratio	n		
ı			*Se	ee Belov	v							5	SQU	ARE	витт	•		
Weld Pass	es Weldi Curre		Weldi Volta		ield G v (SC		lasma Gas Flow Rate	Plasm Pres	a Gas sure	Filler W Size Di		Filler V Rate (Hate M)		erpass perature	Orifice Size
Tack Pass			*****			!					-							
First Pass	116	3	21.	5	80	i	3.5			.063		20		9.	8		RT	.125
2nd Pass	100)	19.	8	80	į	2.0			.063	i	20		8	.8		RT	.125
3rd Pass																		
4th Pass																_		
5th Pass						- 1										_		ļ
6th Pass																_		
7th Pass						1										_		
8th Pass																		
Weld Passes	Electrode Size	Electr Set B		Back Purg Gas Flow			Trail. Shid Gas Flow			Rev. Pol. Time (ms)		dd. Rev. Current		Oscili. vell	Arc O		Arc Osc Positio	
Tack Pass											I							
First Pass	.156	.04	5	100		0	n/a	1	9	4		60	n	/a	n/a	1	n/a	n/a
2nd Pass	.156	.04	5	100		0	n/a	19	9	4		60	n	/a	n/a	1	n/a	n/a
3rd Pass																		
4th Pass																		
5th Pass						:					1							
6th Pass					_	:	ļ	ـــــ			1							
7th Pass					_			_			1							
8th Pass											Ľ							
Comments	:]																	

Torch Shield Gas Bottle Number



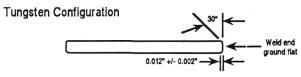
Date Entered	
Date Welded	9-14-96

Plasma Welding Data

Weld panel I	D Program	MatL	Matl. Type Matl. Heat Lot #				atl. facturer	Mati.	Thickne	ss M	fatl. Serial#	Welding Process (dc-,dc+,vppa)	
17-R01	F/Wii	re	2195	-T8	950M	1024A	R	MC	0	.200"	-		VPPA
Operator	Operator Electrode Type Welding			Welding Torch Shield Cup		Torch Orientation		ng ion			asma Ga Type	s Shleid Ga Type	railing Shield Gas Type
BJORK.	2% THOR.	B&B	3	STD.	3°	LEAD	VEF	RT.	HELIU	М	RGON	HELIUI	M n/a
Building#	Power Suppl	y Weid	Fixture	e Weld	Station	Back F Typ		Filler Ty		Filler Heat		Filler Wire Manufacturer	Trailing Shield Type
#4705	HOBART	RCK	TDY	N.	#3	OPEN I BACKSI	FACED HELDER	Che	m 17	n/a	1	RMC	n/a
	Ele	ctrode Co	onfigura	ation					1	Join	Config	uration	
1		*See B	elow							SQU	ARE B	UTT	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass										
First Pass	122	21.5	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	23	8.8	RT	.125
3rd Pass										
4th Pass				i						
5th Pass				I						
6th Pass										
7th Pass				-						
8th Pass				,						

Weld Passes	Electrode Size					Strght. Pol. Time (ms)				Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	: 60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass				i				1				
5th Pass								:				
6th Pass				-				1				
7th Pass				:				:				
8th Pass												



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



Piżsma Gas Bottle Number

EH23 Weld Panel Traceability

Date Entered	
Date Welded	9-14-96

Room Temp

70F

Back Purge Gas Bottle Number

Humidity

75%

Plasma Welding Data

Weld pane	IID I	Program	Code	9	Mati	Туре		Matl. Hea	t Lot#		Matl. nufacture	er .	Matl. Thi	cknes	s	Matl S	erial#		elding Process Ic-,dc+,vppa)
17-R	02	F/Wi	re		219	5-T8		950M0	24A		RMC		0.20	0''	-				VPPA
Operator		trode ype	Weld	ling T	orch	Weldin Shiel			rch station		ding ition		k Purge as Type	Pla	Plasma Ga Type		Shield C Type		Trailing Shiek Gas Type
BJORK.	2% T	HOR.	E	3&B		ST	D.	3° L	EAD	VE	VERT.		HELIUM AF		ARGON		N HELIUI		n/a
Building#	Pow	er Supp	ly \	Weld	Fixtur	e V	eld S	itation		Back Purge Filler Type Ty		r wir ype							railing Shield Type
#4705	нс	BAR'	T F	RCK	TDY	N.	#	3	OPEN BACKSI	FACED HIELDER Chem 17 n/a					F	RMC		n/a	
		Ek	ectrod	le Cor	nfigur	ation								Joint	Confi	juratio	1		
1			*Se	e Be	elow	'							S	QUA	RE	витт			
Weld Passe	s Weldi Curre		Weldi Volta			eld Ga (SCF)		asma Gas low Rate		a Gas	Filler V Size D		Filler W Rate (I			l Rate M)	Inter Tempe		Ortfice Size
Tack Pass	1						1					;							
First Pass	122	2	21.	5	80			3.5	_		.063	3 :	20		9.	9.8		Γ	.125
2nd Pass	100)	19.	8		80	1	2.0			.063	3 1	25		8.	.8	R	Γ	.125
3rd Pass																			
4th Pass							17												
5th Pass							,												
6th Pass							1												
7th Pass																			
8th Pass							\perp												
Weld Passes	Electrode Size	Electi Set E		Back Gas	Purge Flow	Back Gas I	Purge ress.	Trail. Shi Gas Flov			Rev. Po Time (m		dd. Rev. Current	Arc (Arc O Freque		c Ose	
Tack Pass		T																	
First Pass	.156	.04	5	10	00	0		n/a	1	9	4		60	n,	a	n/a	1	n/a	n/a
2nd Pass	.156	.04	5	10	00	0		n/a	1	9	4		60	n,	a	n/a	1	n/a	n/a
3rd Pass							i												
4th Pass												ì							
5th Pass							,					Ĭ.					\bot		
6th Pass							:												
7th Pass		-										- 1							
8th Pass												\perp							
Comments:	7																		
Tungst	en Config	guration			>	30"	— ¹ ← _	_ Weld end											

Torch Shield Gas Bottle Number



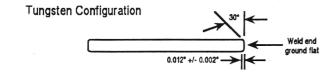
Date Entered	
Date Welded	9-14-96

Plasma Welding Data

Weld panel I			Matl T	Гуре М	e Matt. Heat Lot #		Matl. Manufacturer		Mati	Matl. Thickness		Matl. Serial#		Welding Process (de-,dc+,vppa)
17-R03	F/Wi	re	2195-	-Т8	950M	024 A	R	МС	0).200	o"			VPPA
Operator	Electrode Type	Welding 1		elding Torci Shield Cup		orch entation	Weld Posit		Back Pu Gas Ty		Plasma Typ		Shleid Ga Type	s Trailing Shield Gas Type
BJORK.	2% THOR.	В&В	3	STD.	3° I	LEAD	VEF	RT. HELIUM		ARGON		HELIUN	n/a	
Building#	Power Suppl	y Weld	Fixture	Weld Sta	ation	Back P Typ			wire pe		ler Wire eat Lot#	****	Filler Wire anufacturer	Trailing Shield Type
#4705	HOBART	RCK	KTDYN	I. #3		OPEN F BACKSF	ACED HELDER	Che	m 17		n/a		RMC	n/a
	Ele	ctrode Co	onfigurat	ion						į	oint Con	figura	tion	
		*See B	Below	*						S	QUARE	BU	тт	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				, š						
First Pass	122	21.0	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	23	8.8	RT	.125
3rd Pass										
4th Pass				17						
5th Pass										
6th Pass										
7th Pass										
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				1:								
4th Pass				į,								
5th Pass				:3								
6th Pass				i,								
7th Pass												
8th Pass				· ·				,				



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



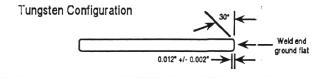
Date Entered	
Date Welded	9-14-96

Plasma Welding Data

Weld panel I			pe M	Matl. Heat Lot #		Matl. Manufacturer		. Mati.	Matl. Thickness			. Serial#	Welding Process (dc-,dc+,vppa)							
17-R04	F/Wi	re 21	95-T	8 8	950M	024A	R	МС	0	.200	o''									VPPA
Operator	Electrode Type	Welding Torc		ding Tórch nield Cup		orch entation	Weldi Posit	842-8888888888		ack Purge Plasn Gas Type T			Shield Gar Type	Trailing Shield Gas Type						
BJORK.	2% THOR.	B&B		STD.	3°	LEAD	VEF	T.	HELIUM ARGO		N	HELIUN	n/a							
Building#	Power Suppl	y Weld Fix	ure	Weld Station		Back P Typ	***************************************	Filler wire Type		Filler Wire Heat Lot#		888 88888B	Filler Wire anufacturer	Trailing Shield Type						
#4705	HOBART	RCKTD	YN.	#3		OPEN F BACKSH		Che	m 17		n/a	T	RMC	n/a						
	Ele	ctrode Config	uratio	n							Joint Conf	gura	tion							
		*See Belo	w	i						S	QUARE	BU	тт							

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				(į				
First Pass	122	21.0	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	24	8.8	RT	.125
3rd Pass				-		ŗ				
4th Pass				ř.						1
5th Pass										
6th Pass										
7th Pass				į						ì
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght. Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		
Tack Pass												
First Fass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				41				*				
4th Pass				;				~				
5th Pass				ì								
6th Pass								:				
7th Pass												
8th Pass												



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



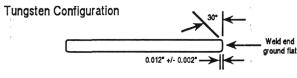
Date Entered	
Date Welded	9-17-96

Plasma Welding Data

Weld panel I	D Program	Code	Mati	l Type	М	lati. Heat	Lot#		Matl. ufacture	er N	Mati. Thic	kness	Matl.	Serial#	Welding Process (dc-,dc+,vppa)
17-R05	F/Wi	re	219	5-T8		950M02	24 A	F	RMC		0.200)"			VPPA
Operator	Electrode Type	Welding	Torch	Welding Shield			rch tation	Weld Posi			Purge Type	900000000000000000000000000000000000000	a Gas pe	Shield Gas Type	Trailing Shiek Gas Type
BJORK.	2% THOR.	В&	В	STD	• ‡	3° LI	EAD	VE	RT.	HEI	LIUM	ARG	ON	HELIUM	l n/a
Building#	Power Supp	ly Wel	d Fixtur	e Wel	d Sta	tion	Back P Typ			r wire		ler Wire		iller Wire nufacturer	Trailing Shield Type
#4705	HOBAR	T RC	KTDY	'N.	#3		OPEN F BACKSH		Che	em 17	7	n/a		RMC	n/a
-	Ek	ectrode C	onfigur	ation		1					J	oint Co	nfiguratio	on	1
		*See I	Below	1	1						S	QUAR	E BUT	Т	
eld Passes	Welding Current	Welding Voltage		eld Gas (SCFH)		ma Gas w Rate	Plasma Pres		Filler W		Filler Wi		avel Rate (IPM)	Interpa: Temperat	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				1		1				
First Pass	122	21.2	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.8	80	2.0		.063	22	8.8	RT	.125
3rd Pass				1		:				
4th Pass				2						
5th Pass				Î.		•				
6th Pass										
7th Pass				ŧ		}				
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0 ,	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0 :	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				7								
4th Pass				44								
5th Pass								1 3				
6th Pass				**				1				
7th Pass				1								
8th Pass				£				·				



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
	7		70F	75%
7	į.			



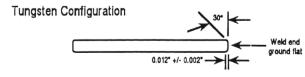
Date Entered	
Date Welded	9-17-96

Plasma Welding Data

Weld panel I	D Program	Code	Mati	.Type	М	lati. He	at Lot#		ati. facturer	Ma	tl. Thic	kness	Mati	. Serial#	Welding Process (dc-,dc+,vppa)
17-RP1	F/Wi	re	219	5-T8		95 0M 0	024A	RI	МС		0.200)"			VPPA
Operator	Electrode Type	Welding	Torch	Welding Shield			orch ntation	Weldi Posit	92°.80000008 8	Back P Gas T		Plasma Typ		Shield Gas	Trailing Shield Gas Type
BJORK.	2% THOR.	В&	В	ST).	3° I	EAD	VER	T.	HELI	UM	ARG	ON	HELIUN	1 n/a
Building#	Power Supp	y Wei	d Fixtur	e We	eld Sta	tion	Back P Typ			wire pe		ller Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBAR	Γ RC	KTDY	N.	#3		OPEN I	FACED HELDER	Che	m 17		n/a		RMC	n/a
	Ele	ctrode C	Configur	ation								loint Cor	figura	tion	
, f		*See	Below	1	<u> </u>					ž.	S	QUARE	BU ⁻	тт	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				(Ţ				
First Pass	122	21.1	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.6	80	1 2.0		.063	25	8.8	RT	.125
3rd Pass				,						
4th Pass				:						
5th Pass				•						,
6th Pass									,	
7th Pass				1						
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass								ì				
5th Pass				1								
6th Pass				Ļ								
7th Pass				,								
8th Pass												



P asma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
		·	70F	75%
		-		



EH23 Weld Panel Traceability

Date Entered	
Date Welded	9-17-96

70F

75%

Plasma Welding Data

Weld panel	ID	Progra	am Cod	е	Mati	Тур	е	Mal	ti. Heat	Lot#		Mati. nufacture	ır	Matl. Thi	ckness		Mati. S	eriali			g Process c+,vppa)
17-RP	2	F/V	Vire		219	5-T8	}	95	50M02	4 A	ı	RMC		0.20	0''	T -			-	VF	PPA
Operator		ctrode Type	Wel	ding	Torch		ing To		Tor Orien			ding ition		ck Purge as Type		ma C Type	ias		d Gas /pe		ling Shiek as Type
BJORK.	2%	ТНОГ	₹.	B&I	3	S	TD.		3° LE	AD	VE	RT.	HE	ELIUM	AF	GO	N	HEI	LIUM		n/a
Building#	Pov	rer Suj	oply	Wek	f Fixtur	e	Weld	Statio	on	Back F Typ			r wir ype		iller W Heat Lo			ler W ufac			ng Shield Type
#4705	Н	ОВА	RT	RCI	KTDY	N.	-	#3		OPEN I	FACED HIELDER	Che	em '	17	n/a			RMC	;		n/a
			Electro	de C	ontigur	ation									Joint (Confi	guratio	n			
			*S	ee E	Below	<u> </u>								S	QUA	RE	витт	•			
Weld Passes	Weld Curr		Weld Volta			eld G (SCI			a Gas Rate	Plasm Pres	a Gas sure	Filler W Size D		Filler W Rate (I			l Rate 'M)		terpass nperatur	٥	rifice Size
Tack Pass													}								
First Pass	12		21			80		3.				.063		20		9.		_	RT	\perp	.125
2nd Pass	10	0	19	.8		80	_	2.	.0			.063	3	25		8	.8	_	RT	+	.125
3rd Pass					+-		+						•	 	\rightarrow			\vdash		+	
4th Pass 5th Pass					-		+						-		\dashv			\vdash		+	
oth Pass					+-		-						- 1	 	-+			\vdash		+	
7th Pass					+-		+								\dashv			\vdash		+	
8th Pass					+		\top								\dashv					十	
						(E		2 PWW					***								
Passes	lectrod Size		ctrode t Back		c Purge s Flow				ill. Shid as Flow			Rev. Pol Time (m		dd. Rev. Current	Arc O Dw		Arc O Frequ		Arc Os Positio		Arc Osci Amplitud
Tack Pass				_				\perp					\perp							\dashv	
First Pass	.156	_	45	-	00		0	+-	n/a	19		4	+	60	n/a		n/a		n/a	\dashv	n/a
	.156	 .0	145	<u> </u>	100	\vdash	0	+	n/a	19	9	4	+	60	n/a	a	n/a	<u>a</u>	n/a	\dashv	n/a
3rd Pass 4th Pass		+		-		\vdash	1	+		+-			7:2		-					\dashv	
oth Pass		+		\vdash		_		-		\vdash	$\overline{}$		1						 	\dashv	
Sth Pass		+		\vdash		\vdash		+		+-	$\overline{}$		1							\dashv	
7th Pass		_						+					1							\dashv	
8th Pass													. E.								
Comments:]												-								
Tungste	en Conf	iguratio	on		4	30°	+		eld end				1								
	_			0.012*	+/- 0.00 2 °	\rightarrow	-	grou	und flat												
Plasma (Gas Bot	tle Nur	nber		Tor	ch S	hield (as B	ottle N	umber		Back I	Purge	Gas Bot	tle Nur	nber		Room	Temp	H	lumidity



Date Entered	
Date Welded	9-17-96

Plasma Welding Data

Weld pane	el ID Pi	rogram Co	de	Matl Typ	oe :	Matt. Hea	t Lot#		Matl. nufacturer	Matl. Ti	nickness	V	lati. Ser	ial# V		Process
17-R	P3	F/Wire	:	2195-T	8	950 M 0	24A		RMC	0.2	00"	-			VP	PA
Operator	Elect Ty		elding To		ding To lield Cu		rch Itation		ding I	Back Purge Gas Type		ma G Type	as St	nleld Gas Type		ng Shiek as Type
BJORK	. 2% TI	IOR.	B&B	,	STD.	3° L	EAD	VE	RT.	HELIUM	AF	GON	1 Н	ELIUM		n/a
Building	Powe	Supply	Weld F	ixture	Weld	Station	Back I Ty		Filler Tyr		Filler W Heat Lo			Wire acturer		g Shield ype
#4705	но	BART	RCK	TDYN.	#	#3	OPEN BACKS	FACED HIELDER	Cher	n 17	n/a		RI	иС		n/a
		Electr	ode Con	ifiguratio	n	1					Joint (Config	uration			
		*(See Be	low							SQUA	RE E	BUTT			
Weld Passe	s Weldin Currer	g We	lding Itage	Shield (Flow (SC		lasma Gas Flow Rate		ia Gas ssure	Filler Wir Size Dia			Travel (IPI		Interpas emperati		ifice Size
Tack Pass First Pass	122	- 2	1.3	80	1/2	3.5	 		.063	20		9.8	+	RT	+	.125
2nd Pass	100		9.8	80	-	2.0			.063	25	-+	8.		RT		.125
3rd Pass	100		3.0	- 00	- 1	2.0	\vdash		.000	25	-+	0.			+	.120
4th Pass					- 1.										\top	
5th Pass																
6th Pass					-					:						
7th Pass																
8th Pass										1-						
Weld Passes	Electrode Size	Electrod Set Baci		PurgeBac Flow Ga		e Trail. Shi Gas Flov		nt. Pol. e (ms)	Rev. Pol. Time (ms)	Add. Rev Current	Arc O Dw		Arc Osc Frequer			Arc Osci Amplitud
Tack Pass											1					
First Pass	.156	.045	10	0	0	n/a	1	9	4	60	n/a	a	n/a	n/	а	n/a
2nd Pass	.156	.045	10	0	0 ;	n/a	1	9	4	60	n/a	a	n/a	n/	а	n/a
3rd Pass					ě,											
4th Pass					į,					:						
5th Pass					15)						
6th Pass					4											
7th Pass										-						
8th Pass					4											

Tungsten Configuration	Weld end ground flat	:		
Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%



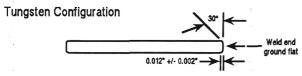
EH23 Weld Panel Traceability Plasma Welding Data

Date Entered	
Date Welded	9-17-96

Weld panel	ID Program	Code	Mati	Туре	М	atl. He	at Lot #		ati. facture	r Mat	l. Thic	kness	Matl	l. Serial#	Welding Process (dc-,dc+,vppa)
17-RP	4 F/Wi	re	2195	5-T8	,	950 M (024 A	R	MC	().20(ייכ			VPPA
Operator	Electrode Type	Welding	Torch	Velding 7 Shield (orch intation	Weldi Posit		Back Pu Gas T)		Plasma Tyj		Shield Gar Type	s Trailing Shiek Gas Type
BJORK.	2% THOR.	B&E	В	STD	•	3° I	LEAD	VEF	ìΤ.	HELIU	JM	ARG	ON	HELIUN	/I n/a
Building#	Power Suppl	ly Wek	d Fixture	e Wel	d Sta	tion	Back P Typ			r wire ype		Her Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBAR	r RCI	KTDY	N.	#3		OPEN F BACKSF		Che	em 17		n/a		RMC	n/a
	Ek	ctrode C	onfigura	ation							,	Joint Co	nfigura	tion	
		*See E	Below							ï	S	QUAR	E BU	тт	
Veld Passes	Welding	Welding		d Gas		ma Ga			Filler W		ler W		ivel Rat	te Interpa	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass						į				
First Pass	122	21.5	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	20.0	80	2.0		.063	23	8.8	RT	.125
3rd Pass						i				
4th Pass				į.						
5th Pass				at .						
6th Pass				3. :						
7th Pass				4.		:				
8th Pass				+-						

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				}								
4th Pass				1				à .				
5th Pass				· t				1				
6th Pass								•				
7th Pass				1				•				
8th Pass				;								



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
	*		70F	75%
	.+			



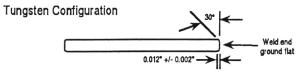
Date Entered	
Date Welded	9-17-96

Plasma Welding Data

D Program	Code Ma	tL Typ	e M	atl. He	at Lot#			Mati	. Thic	kness	Mati	. Serial#	Welding Process (dc-,dc+,vppa)
F/Wi	re 219	95-T8	8 9	950M	024A	R	MC	0).200)"			VPPA
Electrode Type	Welding Torch						@1_0 220000000000000000000000000000000000					Shield Ga Type	s Trailing Shield Gas Type
2% THOR.	B&B	S	STD.	3° I	LEAD	VEF	RT.	HELIL	JM	ARGO	N	HELIUI	/I n/a
Power Suppl	y Weld Fixts	ıre	Weld Sta	tion							****		Trailing Shield Type
HOBART	RCKTD	YN.	#3				Che	m 17		n/a		RMC	n/a
Ele	ctrode Configu	ration	1						ı	oint Con	igura	lion	
	*See Belo	w							S	QUARE	BU ⁻	тт	
	Electrode Type 2% THOR. Power Suppl	F/Wire 219 Electrode Type Welding Torch 2% THOR. B&B Power Supply Weld Fixts HOBART RCKTD Electrode Configu	F/Wire 2195-To Shape Selectrode Type Welding Torch Shape 2% THOR. B&B Selectron B&B Se	F/Wire 2195-T8 Electrode Type Welding Torch Shield Cup 2% THOR. B&B STD. Power Supply Weld Fixture Weld Sta HOBART RCKTDYN. #3 Electrode Configuration	F/Wire 2195-T8 950Mi Electrode Type Welding Torch Shield Cup Orle 2% THOR. B&B STD. 3° I Power Supply Weld Fixture Weld Station HOBART RCKTDYN. #3 Electrode Configuration	F/Wire 2195-T8 950M024A Electrode Type Welding Torch Shield Cup Orientation 2% THOR. B&B STD. 3° LEAD Power Supply Weld Fixture Weld Station Back F Typ HOBART RCKTDYN. #3 OPEN I BACK F Typ Electrode Configuration	Program Code Matt Type Matt. Heat Lot # Manu F/Wire 2195-T8 950M024A R Electrode Type Welding Torch Shield Cup Orientation Posit 2% THOR. B&B STD. 3° LEAD VER Power Supply Weld Fixture Weld Station Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Electrode Configuration	F/Wire 2195-T8 950M024A RMC Electrode Type Welding Torch Shield Cup Orientation Position 2% THOR. B&B STD. 3° LEAD VERT. Power Supply Weld Fixture Weld Station Type Type Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chell Electrode Configuration	Program Code Matt Type Matt Heat Lot # Manufacturer Matt F/Wire 2195-T8 950M024A RMC Content of the RMC Shield Cup Orientation Position Gas Ty 2% THOR. B&B STD. 3° LEAD VERT. HELIL Power Supply Weld Fixture Weld Station Back Purge Type Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 17 Electrode Configuration	Program Code Matt Type Matt Heat Lot # Manufacturer Matt. Thic Manufacturer Matt. Thic Manufacturer Matt. Thic Matt. Thic Five Program Code Program Code Matt. Type Power Supply Welding Torch Shield Cup Orientation Position Gas Type Power Supply Weld Fixture Weld Station Back Purge Type HOBART RCKTDYN. #3 OPEN FACED Chem 17 Electrode Configuration Fixture Program Code Matt. Thic Mat	Program Code Matt Type Matt. Heat Lot # Manufacturer Matt. Thickness Manufacturer Matt. Thickness Matt. Thickness Manufacturer Matt. Thickness Matt. Thickness Manufacturer Matt. Thickness Manufacturer Matt. Thickness Matt.	Program Code Matt Type Matt. Heat Lot # Manufacturer Matt. Thickness Matt. F/Wire 2195-T8 950M024A RMC 0.200" — Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM ARGON Power Supply Weld Fixture Weld Station Back Purge Type Filler Wire Heat Lot # M HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 17 n/a Electrode Configuration Joint Configura	Program Code Matt Type Matt. Heat Lot Manufacturer Matt. Thickness Matt. Serials F/Wire 2195-T8 950M024A RMC 0.200" Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Gas Shield Ga Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM ARGON HELIUM Power Supply Weld Fixture Weld Station Back Purge Type Filler Wire Heat Lot Manufacturer HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 17 n/a RMC Electrode Configuration Joint Configuration

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				.1		!				
First Pass	122	22.0	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.6	80	2.0		.063	25	8.8	RT	.125
3rd Pass				ŧ.		,				
4th Pass				i						
5th Pass				1						
6th Pass			1			:				
7th Pass				٠.		į.				
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current		Arc Oscill. Frequency		
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass												
4th Pass								÷				
5th Pass								7				
6th Pass												
7th Pass				,								
8th Pass												



Piasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%
14				



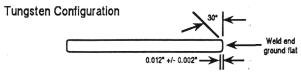
Date Entered	
Date Welded	9-17-96

Plasma Welding Data

Weld panel	ID Program	Code	Matl T	ype f	Vatl. He	at Lot #		atl. facture	r Mati	. Thic	kness	Matt. Serial#		Welding Process (dc-,dc+,vppa)
18-R01	ı F/Wi	re :	2195-7	Т8	950M	024A	R	MC	0	.200)"			VPPA
Operator	Electrode Type	Welding To		elding Torc Shield Cup		orch entation	Weldi Posit		Back Pul Gas Ty		Plasma Typ		Shieid Ga Type	s Trailing Shield Gas Type
BJORK.	2% THOR.	B&B		STD.	3° I	LEAD	VER	T.	HELIU	IM	ARGO	NC	HELIUM	n/a
Building#	Power Supp	y Weld I	ixture	Weld St	ation	Back P Typ	00001000000000000		r wire ype		ler Wire eat Lot#		Filler Wire anufacturer	Trailing Shield Type
#4705	HOBAR	RCK	ΓDYN.	. #3	}	OPEN F BACKSH		Che	em 18		n/a		RMC	n/a
	Ele	ctrode Cor	figurati	on						J	oint Con	igura	tion	
		*See Be	low	Ĩ.					į	S	QUARE	BU	гт	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				i i						
First Pass	122	21.0	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.7	80	2.0		.063	24	8.8	RT	.125
3rd Pass										
4th Pass										
5th Pass						·				
6th Pass										
7th Pass				,						
8th Pass										

Weld Passes	Electrode Size		Back Purge Gas Flow							Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	- 60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				į								:
4th Pass				ì								
5th Pass				5,7								
6th Pass								-				
7th Pass				4				'				
8th Pass				7								



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
1			70F	75%
-				



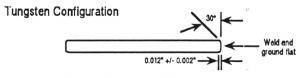
Date Entered	
Date Welded	9-17-96

Plasma Welding Data

Weld panel I	D Program	Code M	atl Ty	pe M	Aatl He	at Lot#		atl. facturer	Mati	. Thicknes	s M	Matt. Serial#		(elding Process (dc-,dc+,vppa)
18-R02	F/Wi	re 21	95-T	8	950M	024A	R	MC	0	.200"	-			VPPA
Operator	Electrode Type	Welding Torc		lding Torch hield Cup		orch intation	Weldi Posit	91 555 SS 555 SS 555	Back Pu Gas Ty		sma Ga Ty pe	s Shield G Type		Trailing Shield Gas Type
BJORK.	2% THOR.	B&B		STD.	3° I	LEAD	VEF	T.	HELIL	JM A	RGON	HELIL	JM	n/a
Building#	Power Suppl	y Weld Fix	ure	Weld Sta	ation	Back P Typ		Filler Tyr		Filler V Heat L		Filler Wire Manufacture		Trailing Shield Type
#4705	HOBART	RCKT	YN.	#3		OPEN F BACKSF		Cher	n 18	n/a		RMC		n/a
	Ele	ctrode Config	uratio	n						Joint	Configu	ration		
		*See Belo	w						:	SQUA	RE B	UTT		

Weld Passes	Weiding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				i,	ţ				
First Pass	122	21.0	80	3.5	 .063	20	9.8	RT	.125
2nd Pass	100	19.7	80	2.0	.063	24	8.8	RT	.125
3rd Pass				1					i
4th Pass									É
5th Pass				-					,
6th Pass									
7th Pass									
8th Pass									

Weld Passes	Electrode Size		Back Purge Gas Flow							Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				\ .								
4th Pass								ſ				
5th Pass				17				· .				
6th Pass								,				
7th Pass												
8th Pass								,				



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%
	·			



Date Entered	
Date Welded	9-17-96

70F

75%

Plasma Welding Data

Weld pane	מוו	Progra	ım Cod	е	Mati	. Туре	2	Matl. Hear	Lot#		Mati. Iufacture	r	Matl. Thi	ckness	Mal	l. Serial			ng Procesi dc+,vppa)
18-R0)3	F/V	Vire		219	5-T8		950M0	24 A	F	RMC		0.20	0''			-	٧	PPA
Operator		ctrode Type	Wel	ding	Torch		ng To eld Cu		rch tation	Wel Pos	ding ition		ck Purge as Type		a Gas pe		ld Gas ype		illing Shiel Gas Type
BJORK.	2%	ТНОЕ	₹.	B&I	В	s	TD.	3° L	EAD	VE	RT.	Н	ELIUM	ARC	ON	HE	LIUM		n/a
Building#	Pov	er Sup	oply	Wek	d Fixtur	e	Weld	Station	Back F Typ		Fille	r wir ype		iller Wir Heat Lot		Filler W Nanufac		Trai	ling Shield Type
#4705	Н	OBAI	RT	RCI	KTDY	N.	#	‡3	OPEN I BACKSI	FACED HIELDER	Che	em '	18	n/a		RM			n/a
		ļ	Electro	de C	onfigur	ation								Joint Co	nfigura	ation			
ř			*S	ee E	Below	1	1:						S	QUAR	E BU	TT			
Weld Passes	Weld Curr		Weld Volta			eld Ga		lasma Gas Flow Rate	Plasm Pres	a Gas sure	Filler W Size D		Filler W Rate (I		avel Ra (IPM)		nterpass nperatu		Oriffice Size
Tack Pass							1											I	
irst Pass	12		21	-	-	80	1	3.5			.063		20		9.8		RT	4	.125
nd Pass	10	0	19	.7		80	- -	2.0	_		.063		24		8.8		RT	+	.125
ord Pass	-				+-		-					-				-		+	
Ith Pass	-				+		- 1		-				-	_		_		+	
oth Pass Oth Pass	-	-			+							1	 			-		+	
th Pass	+	_			+-		-		-			-		-		\dashv		+	
8th Pass	\vdash	-			+-		+		-				 			_		+	
000000000000000000000000000000000000000		000 0000000		1 100000000		\$ 200000000		0 0000000000000000000000000000000000000	·		***************************************	000 0000		II	00000 100000				
Weld E Passes	ectrod Size		ctrode Back					e Trail. Shio . Gas Flow			Rev. Pol. Time (ms		dd. Rev. Current	Arc Ose Dwel		: Oscill. quency			Arc Osc Amplitud
ack Pass																			
irst Pass	.156	.0	45	1	00		0	n/a	19	9	4		6 0	n/a		n/a	n/a	<u>a</u>	n/a
nd Pass	.156	.0	45	1	100	<u> </u>	0	n/a	19	9	4		60	n/a		n/a	n/a	<u>a</u>	n/a
rd Pass						_	ŀ					1							
th Pass				_		_						-			\perp				
th Pass		+		_		_	. 1	1	+-	\dashv		1:			+		-		
Sth Pass		+		-		-		-	+			+			+		-		
th Pass		+		_		_	-	-	+	-+		1			+		-		
un Pass								1											
· · · · · · · · · · · · · · · · · · ·	en Conf			0.012*	+/- 0.002*	30°		Weld end ground flat i.as Bottle N				4.		tle Numb					



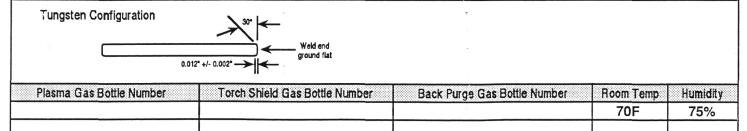
Date Entered	
Date Welded	9-17-96

Plasma Welding Data

Weld panel I	Weld panel ID Program Code Matt. Type						MatL Heat Lot #			r Mati.	Matl. Thickness			Serial#	Welding Process (dc-,dc+,vppa)
18 -R 04	F/Wi	re	2195	5-T8	9	950M0	024A	RI	MC	0	0.200"				VPPA
Operator	Electrode Type	Welding 1			lding Torch hield Cup (orch ntation	Weldi Positi		Back Pur Gas Typ		Plasma G Type			s Trailing Shield Gas Type
BJORK.	2% THOR.	B&E	3	ST	D.	3° LEAD		VER	т.	HELIU	М	ARGO	N	HELIUN	/I n/a
Building#	Power Supp	y Weld	i Fixtur	e W	/eld Sta	tion	Back P Typ	***************************************		r wire ype		r Wire t Lot#			Trailing Shield Type
#4705	HOBAR	r RCK	KTDY	N.	#3		OPEN F BACKSH		Che	em 18	n	/a		RMC	n/a
	Ek	ctrode Co	onfigur	ation							Joi	nt Config	jural	lion	
		*See B	Below								SQI	JARE I	BUT	ГТ	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass	***************************************			ĺ						
First Pass	122	21.1	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.6	80	2.0		.063	25	8.8	RT	.125
3rd Pass				· ·		÷				
4th Pass										
5th Pass										
6th Pass						1				
7th Pass				t -						
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current	Arc Oscill. Dwell	Arc Oscill. Frequency	Arc Oscill. Position	Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass								-				
4th Pass				1								
5th Pass				1								
6th Pass				,				1				
7th Pass				:				+				
8th Pass												





Plasma Gas Bottle Number

EH23 Weld Panel Traceability Plasma Welding Data

Date Entered	
Date Welded	9-18-96

Weld panel	ID P	rogram (Code	Ма	tl Typ	oe -	Ма	ati. Heat	Lot#		Mati. Iufacture	r	Mati. Thi	cknes	s	Matl S	erial#		lding Proce lc-,dc+,vppa
18-R0	5	F/Wir	е	219	95-T	8	9	50M02	4 A		RMC		0.20	0''	-			-	VPPA
Operator		rode pe	Veldin	g Torch		ding To leld Ct		Tor Orient			ding ition		k Purge as Type	Pla	sma G Ty pe	ias (Shield Typ		Trailing Shi Gas Type
BJORK.	2% T	нов.	В	&B	,	STD.		3° LE	AD	VE	RT.	HE	ELIUM	AF	RGO	N	HEL	IUM	n/a
Building#	Powe	r Supply	W	eld Fixtu	ire	Weld	Stati	ion	Back P Typ			r wir ype		iller W Heat L			er Wi ufacti		railing Shie Type
#4705	но	BART	R	CKTD	YN.	;	‡3		OPEN F BACKSH	ACED HELDER	Che	em 1	18	n/a		F	RMC		n/a
		Elec	trode	Configu	ıratio	ì								Joint	Config	juration	1		
			*See	Belov	N							;	9	QUA	RE	витт	•		
Weld Passes	Weldin Currer		elding		ield (w (SC			na Gas / Rate	Plasma Pres		Filler W Size D		Filler W Rate (I			l Rate M)		erpass perature	Orifice Si
Tack Pass					***********	i,	00000000					\$ \$				000000000000000			
irst Pass	122		21.0		80	1	3	.5			.063	}-	20		9.8	В		RT.	.125
nd Pass	100		19.5		80		2	.0			.063	1	25		8.	.8	F	RT.	.125
Brd Pass						- 4													-
4th Pass				_		ì				_		,		\dashv			_		
oth Pass				-		_+				_				_			_		
Sth Pass						12													-
7th Pass				+				-				.					-		-
8th Pass														1					
Weld El Passes	ectrode Size	Electro Set Ba		ack Purç Gas Flov				all. Shid as Flow	Strght Time		Rev. Pol Time (m:		dd. Rev. Current	Arc C		Arc O: Freque		Arc Os Positio	
Tack Pass							T					-							
irst Fass	.156	.045		100		0		n/a	19	9	4		60	n/	а	n/a	1	n/a	n/a
nd Pass	.156	.045		100		0		n/a	19		4		60	n/	а	n/a		n/a	n/a
Brd Pass						î						ij							
th Pass						25, 13	_					1							
th Pass						!!						1							
th Pass						1						1							
th Pass												,							
th Pass												1							
Comments:																			
Tungste	n Config	uration			30"	-		eld end											

Torch Shield Gas Bottle Number

Back Purge Gas Bottle Number

Humidity

75%

Room Temp 70F



Plasma Gas Bottle Number

EH23 Weld Panel Traceability

Date Entered	
Date Welded	9-18-96

Room Temp

70F

Back Purge Gas Bottle Number

Humidity

75%

Plasma Welding Data

Weld pane	I ID	Progran	n Code	Ma	tl Typ	8	Ma	atl Heat	Lot#	Mai	Mati. nufacture	ır	Matl. Th	ickne	ss	Matl. S	Seriali		elding Prod dc-,dc+,vp
18-RF	21	F/W	ire	219	95-T8	}	9	50M02	4 A		RMC		0.20	0''	-			-	VPPA
Operator		trode ype	Weldi	ng Torch		ing To		Tor Orient			ding ition		ck Purge as Type	PI	asma G Type	as	Shield Ty	i Gas pe	Trailing S Gas Ty
BJORK.	2% 1	HOR	. В	&B	s	TD.		3° LE	AD	VE	RT.	H	ELIUM	A	RGO	N	HEL	.IUM	n/a
Building#	Pow	er Supp	oly V	eld Fixt	ire	Weld S	Stat	ion	Back F			r wir		iller \			ller W nufact		Frailing Sh Type
#4705	н	DBAR	T R	CKTD	YN.	#	:3		OPEN BACKS	FACED HIELDER	Che	em '	18	n/a	1		RMC	;	n/a
	L	El	ectrode	Config	ration						1			Joint	Config	guratio	'n		
			*Se	e Belo	N	1							5	QU.	ARE	вит	Γ		
Weld Passes	Weldl Curre		Weldin Voltag		ield G w (SCI			na Gas v Rate	Plasm Pres	a Gas isure	Filler W Size D		Filler V Rate (I		Trave (IP	l Rate M)		erpass peratur	e Orifice
Tack Pass								_				- 1					_		
irst Pass	122		21.0		80	- -		.5			.063		20		9.			RT	.125
and Pass Brd Pass	100	-	19.9		80	, ř	2	2.0			.063	3	25		8.	.8	+	RT	.125
4th Pass	-	-+		_		13						-					+		-
oth Pass		\dashv		_		- F							 				+		+
Sth Pass		-		_		1						i	 				+		
7th Pass		\neg				17						Ţ	 				\top		
8th Pass																			
Weld I	ectrode Size		rode B Back	ack Pur Gas Flov	jeBaci Gas	k Purge Press	e Tr . G	all. Shid las Flow			Rev. Po Time (m		dd. Rev. Current		Oscill. well)scill. Jency	Arc Os Positi	
Tack Pass							T					T							
irst Pass	.156	.04	5	100		0		n/a	1	9	4		60	r	ı/a	n/	a	n/a	n/
nd Pass	.156	.04	15	100		0 ,	Ι	n/a	1	9	4		60	r	ı/a	n/	a	n/a	n/
ord Pass						ŕ	L												
th Pass						1													
th Pass						Ω	L					1							
th Pass						: e	_					-		_					
th Pass							\perp					Ŀ		_					
th Pass			\bot			-						1							
Comments:	7																		
	en Confi											:		-					

Torch Shield Gas Bottle Number



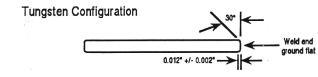
Date Entered	
Date Welded	9-18-96

Plasma Welding Data

Weld panel ID Program Code Matt. Type							at Lot#	M Manu	Mat	Matl. Thickness			.Serial#		ling Process -;dc+,vppa)	
18-RP2	2 F/Wii	re	219	5-T	8 950M024A			R		0.200"				VPPA		
Operator	Operator Electrode Welding Torch				Welding Torch Shield Cup Orientation			Weldi Posit		Back Pu Gas Ty		Plasma Typ		Shield Ga Type	s Ti	alling Shield Gas Type
BJORK.	2% THOR.		В	5	STD.	3° I	LEAD	VEF	IT.	HELIU	JM	ARG	ОИ	HELIUN	И	n/a
Building#	Power Suppl	y We	ld Fixtu	e	Weld Sta	ation	Back P Typ			wire pe		ler Wire eat Lot#	0000 00000	Filler Wire anufacturer	Tra	iling Shield Type
#4705	HOBART	RC	KTDY	'N.	#3		OPEN F BACKSH		Che	m 18		n/a		RMC		n/a
	Ele	ctrode (Configur	ation	n						·	oint Con	figura	lion		
,		*See	Below	1	1					ş.	S	QUARE	BU	ГТ		

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				4		1				***************************************
First Pass	122	21.0	80	∜ 3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.6	80	2.0		.063	25	8.8	RT	.125
3rd Pass										
4th Pass				3						
5th Pass										
6th Pass										
7th Pass				:						
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current	Arc Oscill. Dwell	Arc Oscill. Frequency	Arc Oscill. Position	Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				7.74				7				
4th Pass								ł				
5th Pass				-)				
6th Pass												
7th Pass				- 8								
8th Pass				:								



P.asma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
-	*	,	70F	75%



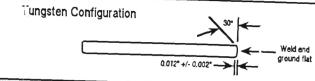
Date Entered	
Date Welded	9-18-96

Plasma Welding Data

	3000000 9000000000000000000000000000000					J								
Weld panel	ID Program	Code	Mati	. Туре	Matl. H	leat Lot #	Mati. Manufacturer		er M	Matl. Thickness		Matt. Serial#		Welding Proces
18-RP	18-RP3 F/Wii		e 2195-		950N	/I024A	A RMC		RMC		סיים			(dc-,dc+,vppa)
Operator	турс	Type Weiding		Velding To Shield Cu	orch Torch Orientation		Weld Posi		Back Gas	Purge Type	Plasma Type		Shield Gas	
BJORK.	2% THOR.	В&	В	STD.	3°	LEAD	VEF	RT.	HELIUM		ARGO	ON HELIUI		
Building#	4705		Weld Fixture Weld :			Back P			r wire				Filler Wire anufacturer	Trailing Shield
#4705			KTDYN	DYN. #3		OPEN F BACKSH		Che	m 18		n/a		RMC	Type n/a
	Elec	drode C	onfigura	tion						J	oint Config	gurati		1,70
		*See E	Below	¥.					,	SC	UARE	BUT	T	

50000000000000000000000000000000000000		3 96000000000000000000000000000000000000	000 00000			SQUARE BUTT									
Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)	Plasma Gas Flow Rate	Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire	Travel Rate		Orifice Size					
Tack Pass				7.		OKO DIA.	Rate (IPM)	(IPM)	Temperature	Office offe					
First Pass	122	21.0	80	3.5											
2nd Pass	100	19.7	80			.063	20	9.8	RT	.125					
3rd Pass		1011	1 00	2.0		.063	25	8.8	RT	.125					
4th Pass			 												
5th Pass			 	-											
6th Pass			 												
7th Pass			 												
8th Pass			 												

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol.	Rev. Pol.	Add. Rev.	Arc Oscill.	Arc Oscill	Arc Oscill	Are Oscill
Tack Pass					85-1	sume times	rune (ms)	Current	Dwell	Frequency	Position	Amplitude
First Pass	.156	.045	100	0	7/2	-10						
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass	-1.00	.045	100	-	n/a	19	4	. 60	n/a	n/a	n/a	n/a
4th Pass												
5th Pass								<u>;</u>				
6th Pass								-				
7th Pass								,				
8th Pass												



Plasma Gas Bottle Number	Test Object			
THE GOLD HOURDS	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
	·		70F	75%



Plasma Gas Bottle Number

EH23 Weld Panel Traceability

Date Entered	
Date Welded	9-18-96

Plasma Welding Data

Weld panel	D D	Program (Code	Mat	I. Туре)	Matl. Hea	t Lot#		Matl. ufacturer		Mati. Th	ckne	SS	Mati. S	erial#		iding Proces c-,dc+,vppa)
18-RP	4	F/Wir	е	219	5-T8		950M0	24 A	ı	RMC		0.20	0.200"		-	VPPA		
Operator		ctrode ype	Welding	g Torch	Weldi Shle	ng Tor eld Cur		orch ntation		ding ition		k Purge as Type			sma Gas Shield Ga Type Type			Trailing Shiel Gas Type
BJORK.	2% 1	THOR.	В&	в	S	TD.	3° L	EAD	VE	RT.	HE	ELIUM	A	RGO	N	HELIUM		n/a
Building#	Pow	er Supply	We	ld Fixtu	re '	Weld S	Station	Back Pi		Filler	wir pe		iller \			Filler Wire Manufacturer		railing Shield Type
#4705	н	DBART	RC	KTD	/N.	#	3	OPEN F BACKSH	ACED IELDER	Che	m 1	18	n/a	ì	RMC			n/a
)		Elec	ctrode (Configu	ration					-1			Joint	Config	guration	1	l	
			*See	Belov	v	,						S	QU	ARE	витт	ı		
Weld Passes	Weldi Curre		Velding Voltage		eld Ga v (SCF		asma Gas low Rate	Plasma Pres:		Filler W Size Di		Filler V Rate (l		Trave (IP	l Rate M)		erpass perature	Orifice Size
Tack Pass			·····			, i					1							
irst Pass	122		21.4		80	1	3.5			.063	i	20		9.8			RT	.125
2nd Pass	100	<u> </u>	19.3		80	- 1	2.0			.063	1	25		8.8		F	RT	.125
ord Pass Ith Pass						7.		-			-							
oth Pass		_		_		17		-										
oth Pass				_		+					i							
th Pass		-+		-		+		 			-							
Sth Pass				\top		1												
Weld E	lectrode Size	Electro Set Ba		ck Purg as Flow	eBack Gas	Purge Press.	Trail. Shi Gas Flov			Rev. Pol. Time (ms		dd. Rev. Current			Arc Os Freque	000000000000000000000000000000000000000	Arc Osc Positio	
ack Pass					1						T							
irst Pass	.156	.045		100		0	n/a	19		4	I	60	n	/a	n/a		n/a	n/a
	.156	.045		100		0 .	n/a	19		4	I	60	n	/a	n/a	1	n/a	n/a
rd Pass						i.					\perp							
th Pass					_				\bot		1		_					
th Pass					_	4		_			1		_					
th Pass		+	-			- 1		-	\dashv		1							
th Pass		-	-		+-		-		\dashv		4		_			_		
th Pass															L			
Comments:																		
Tungste	n Confi	guration		•	∑ 30° -	: ←					ŧ							
	_				\leq		_ Weld end											
	_		0.013	2" +/- 0.002			ground flat											

Torch Shield Gas Bottle Number

Back Purge Gas Bottle Number

Room Temp

70F

Humidity

75%



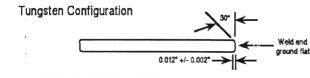
Date Entered	
Date Welded	9-18-96

Plasma Welding Data

Weld panel ID Program Cod		tl. Type	Matl. Heat Lot #		M Manu	Mati	Matl. Thickness			Serial#	Welding Process (dc-,dc+,vppa)		
F/Wi	re 219	5-T8	95	50M024A	RMC 0.200").200"		0.200"				VPPA
Operator Electrode Type				Torch Orientation							Shield Gas Type	Trailing Shield Gas Type	
2% THOR.	B&B	STD		3° LEAD	VER	т.	HELIU	ELIUM AI		ИС	HELIUM	n/a	
Building# Power Supply		re Wel				Filler wire Type		Filler Wire Heat Lot#				Trailing Shield Type	
#4705 HOBART		KTDYN. #3					em 18 r		n/a		RMC	n/a	
Ele	ctrode Configu	ration							loint Con	figura	ion	1_	
	*See Belov	W						S	QUARE	BU	гт		
The state of the s	F/Win Electrode Type 2% THOR. Power Suppl	F/Wire 219 Electrode Type Weiding Torch 2% THOR. B&B Power Supply Weid Fixture HOBART RCKTD'S Electrode Configuration	F/Wire 2195-T8 Electrode Type Welding Torch Shleid C 2% THOR. B&B STD. Power Supply Weld Fixture Weld	F/Wire 2195-T8 95 Electrode Type Welding Torch Shield Cup 2% THOR. B&B STD. Power Supply Weld Fixture Weld Static HOBART RCKTDYN. #3 Electrode Configuration	F/Wire 2195-T8 950M024A Electrode Type Welding Torch Shield Cup Torch Orientation 2% THOR. B&B STD. 3° LEAD Power Supply Weld Fixture Weld Station Back Type HOBART RCKTDYN. #3 OPEN BACKS Electrode Configuration	F/Wire 2195-T8 950M024A RI Electrode Type Welding Torch Shield Cup Orientation Positi 2% THOR. B&B STD. 3° LEAD VER Power Supply Weld Fixture Weld Station Back Purge Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Electrode Configuration	F/Wire 2195-T8 950M024A RMC Electrode Type Welding Torch Shield Cup Orientation Position 2% THOR. B&B STD. 3° LEAD VERT. Power Supply Weld Fixture Weld Station Back Purge Type Ty HOBART RCKTDYN. #3 OPEN FACED RACKSHIELDER Che Electrode Configuration	F/Wire 2195-T8 950M024A RMC 0 Electrode Type Welding Torch Shield Cup Orientation Position Gas Ty 2% THOR. B&B STD. 3° LEAD VERT. HELIU Power Supply Weld Fixture Weld Station Back Purge Type Type HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 18 Electrode Configuration	F/Wire 2195-T8 950M024A RMC 0.200 Electrode Type Welding Torch Shield Cup Orientation Position Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM Power Supply Weld Fixture Weld Station Back Purge Type Filler wire Type H HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 18	F/Wire 2195-T8 950M024A RMC 0.200" Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM ARGO Power Supply Weld Fixture Weld Station Back Purge Type Filler wire Type Heat Lot# HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 18 n/a Electrode Configuration Joint Con	F/Wire 2195-T8 950M024A RMC 0.200" Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Gas Type 2% THOR. B&B STD. 3° LEAD VERT. HELIUM ARGON Power Supply Weld Fixture Weld Station Type Type Filler Wire Heat Lot# M HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 18 n/a Electrode Configuration Joint Configuration	F/Wire 2195-T8 950M024A RMC 0.200" Electrode Type Welding Torch Shield Cup Orientation Position Gas Type Plasma Gas Shield Gas Type Type Type Power Supply Weld Fixture Weld Station Back Purge Type Filler wire Type Heat Lot# Manufacturer Back Purge Filler wire Filler Wire Heat Lot# Manufacturer Back Purge Filler wire Filler Wire Heat Lot# Manufacturer HOBART RCKTDYN. #3 OPEN FACED BACKSHIELDER Chem 18 n/a RMC Electrode Configuration Joint Configuration	

Weld Passes	Welding Current	Welding Voltage	Shield Gas Flow (SCFH)		Plasma Gas Pressure	Filler Wire Size Dia.	Filler Wire Rate (IPM)	Travel Rate (IPM)	Interpass Temperature	Orifice Size
Tack Pass				3		3				
First Pass	122	21.4	80	3.5		.063	20	9.8	RT	.125
2nd Pass	100	19.5	80	2.0		.063	25	8.8	RT	.125
3rd Pass				i.		-				:
4th Pass				÷.						
5th Pass				1		i i				
6th Pass				1		,				
7th Pass				-1						
8th Pass										

Weld Passes	Electrode Size	Electrode Set Back	Back Purge Gas Flow	Back Purge Gas Press.	Trail. Shid. Gas Flow	Strght, Pol. Time (ms)	Rev. Pol. Time (ms)	Add. Rev. Current	Arc Oscill. Dwell	Arc Oscill. Frequency		Arc Oscill. Amplitude
Tack Pass												
First Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
2nd Pass	.156	.045	100	0	n/a	19	4	60	n/a	n/a	n/a	n/a
3rd Pass				7-1-								
4th Pass								:				
5th Pass								1				
6th Pass								į				-
7th Pass				1								
8th Pass				-								



Plasma Gas Bottle Number	Torch Shield Gas Bottle Number	Back Purge Gas Bottle Number	Room Temp	Humidity
			70F	75%
	*			

APPENDIX D REPAIR WELD RECORDS

FE19 A (16RPEA)	70.1	1	\$8-12-5		13. VEZSVIN		0/4/2		1112/10																																				
PANEL	THICKNESS	}	OATE	•	WELDOR		INITIAL WIRE		REPAIR WIRE												į																								
TEMP F					TEMP F							TEMPF							TEMP F							TEMP.F						TEMPE							TEMP F						
TRAVEL(IPM)	11-25				TRAVEL (IPM)	3 1/	11/28					TRAVEL (IPM)	// 8	17-78					TRAVEL(IPM)	A.K.	12 6	,				TRAVEL (IPM)	11.18	777				TRAVEL (IPM)							TRAVEL (IPM)						
TIME(SECONDS)					TIME(SECONDS)							TIME(SECONDS)							TIME(SECONDS) 1						_	TIME(SECONDS)						TIME(SECONDS)							TIME (SECONDS) TRAVEL (IPM)						
VOLTS	15				VOLTS	13	1,7					VOLTS	7,7	1.7					VOLTS	1.7	1 5/	/ /			\Box	VOLTS	7	*	1	1		VOI 7S	T						VOLTS						
AMPS 100	1007				AMPS	100	100	•				AMPS	100	S					AMPS	low	1111				П	AMPS	1/1/1	2				AMPS	Π						AMPS						
PASS 1ST PASS	2ND PASS 3RD PASS	4TH PASS	5TH PASS	6TH PASS	PASS	1ST PASS	2ND PASS	3RD PASS	4TH PASS	5TH PASS	6TH PASS	PASS	1ST PASS	2ND PASS	3RD PASS	4TH PASS	5TH PASS	6TH PASS	PASS	1ST PASS	2ND PASS	3RD PASS	4TH PASS	STH PASS	6TH PASS	PASS	IST PASS	ZND PASS	ATH PACC	STH PASS	6TH PASS	PASS	1ST PASS	2ND PASS	3RD PASS	4TH PASS	STH PASS	6TH PASS	PASS	1ST PASS	2ND PASS	3RD PASS	4TH PASS	STH PASS	6TH PASS
ROCA					SIDE	COVER						SIDE	2007						SIDE	ank					۱	SIDE	ACT.					SIDE	Ĺ						SIDE						
R1 WELD	RI WELD	RI WELD	R1 WELD	R1 WELD		LENGTH R2 WELD	R2 WELD	R2 WELD	R2 WELD	R2 WELD	R2 WELD		R3 WELD	イイペン R3 WELD	R3 WELD	R3 WELD	R3 WELD	R3 WELD		R4 WELD		KS WELD	NO WELD	RS WELD	RS WELD	RS WELD		R6 WELD	R6 WELD	R6 WELD	R6 WELD	R6 WELD	R6 WELD		R7 WELD										
틸	7200					LENGTH	4200						LENGTH R3 WELD	4.403						LENGTH	4.00					112011		74/4/7					LENGTH R6 WELD							LENGTH					
WIDE	186					WIDE	19.5						WIDE	0.5						WIDE	765					2011	WICE						WIDE							WIDE					
DEEP	100					OFF	1500						DEEP	101						DEEP	7,77					0	UEEF						DEEP					i		DEEP					
SHAVE	/ 8/				SHAVE	CKIND	4					SHAVE	GRIND	4					SHAVE	GRIND	1				27.47.0	SHAVE	CKIINO					SHAVE	GRIND						SHAVE	GRIND					

	1-117-0 (16K46K)		<i>302'</i> SS:		35-11-0	16410	6 112	1	118E 7/4/1			WIRE WILL WILL																																									
	PANEL		THICKNESS	Γ		į T	WELDOR	Т	INITIAI WIDE	T	T	KEPAK WIKE	1		<u>.</u>	<u> </u>		Γ	 	T		Į,					Т		7	<u>.</u>	7				1		L.		1		7		7		7						I		
TEMP.F					\downarrow	\downarrow	TEMPE		1	-	1				TEMPF					1		TEAMOR		1		1	\downarrow			TEMPF							TEMPF			_		1		TEMP.F				L					
TRAVEL (IPM)	11.8	11 08					TRAVEL (IPM)								TRAVEL (IPM)	11:0	11.5					TDAVCI (IDAA)	יייייייייייייייייייייייייייייייייייייי	`	1/3					TRAVEL (IPM)	110	10.10	,				TRAVEL(IPM)							TRAVEL(IPM)									
TIME(SECONDS) TRAVEL (IPM)							TIME(SECONDS)								TIME(SECONDS) TRAVEL (IPM)							TIME (SECONDS) TBAYEL (IBM)	IME OF COLUMN							TIME(SECONDS) TRAVEL(IPM)							TIME(SECONDS)							TIME(SECONDS)								Page 1	•
VOLTS 1	1	1.57					VOL TS	T	†	†	1	1	1		VOLTS	6/	2				1	VOI TO	T	1	†	1	1		7	٦	7	7	\			╗	VOLTS 1					1	7	VOLTS									
11	Cal	1001					AMPS	Τ.			\dagger	1			AMPS V	1001	000				1	AMPS	T		03	1	1	1	Т	Т	160	7367				Т	AMPS			1	1	1	Т	AMPS									
PASS A	1ST PASS	2ND PASS	3RD PASS	4TH PASS	STHPASS	6TH PASS	PASS	1ST PASS	2ND PASS	3RD PASS	ATU DACE	2000	SHLASS	61H PASS	PASS A	1ST PASS	2ND PASS	3RD PASS	4TH PASS	STHPASS	ETU DACE	PASS	ST DACE	SOL LOS	SUN LASS	SKU PASS	STIL DAGG	310 1783	OIN PASS	PASS	151 PASS	2ND PASS	3RD PASS	4TH PASS	STH PASS	61H PASS	PASS	IST PASS	ZND PASS	3KD PASS	41H PASS	STUDYES	DIRPASS	PASS A	CCV I I	2ND PASS	3RD PASS	4TH PASS	STH PASS	6TH PASS			
SIDE	KOOL						SIDE	12			Ī			1	SIDE	104						SIDE		X 77.35	1				ı		MOL					-	SOE					Ī	ł	TO SEC									
	WELD	1 WELD	1 WELD	1 WELD	R1 WELD	R1 WELD		2 WELD	2 WELD	R2 WELD	2 WEI D	יאיני ט	ל שברט	KZ WELD	57	3 WELD	R3 WELD	3 WELD	R3 WELD	3 WFI D	Dawel D		R4 WEI D	Nu P	N CLO	אנונס	N C C C	DA WELD	A WELO	S WEI D	3 WELU	R5 WELD	5 WELD	SWELD	RS WELD	2 WELU	"	R6 WELD	6 WELD	Ko WELU	No WELD	DE WELD		ט איננו ט	NEL D	R7 WELD	R7 WELD	R7 WELD	7 WELD	R7 WELD			
	LENGIH KI WELD	7 200T	R1 WELD	<u> </u>	lα	Ιœ		LENGTH R	1/2.M	N. N.	10	<u> </u>	<u> </u>	٢		LENGTH R	4 45C	R	l∝	Jα	<u> 10</u>	1	FNGTH		7	NA WELD	<u> </u>	<u> </u>		CALCITO	FIGURE	4. 18 B	Ξľ	<u> </u>	<u> </u>	=		LENGIH R	¥	z je	<u> </u>	<u> </u>	-	O PLOISE		2	α۱	æ	œ	Œ			
П	Т.	1821					-	WIDE	c	-						WIDE LE	-541					-	WIDE	1	┫.				-	יאווטב	1	133					٦	WIDE	1				-	SUM	1	-							
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П	\int	7,7					SHAVE	GRIND	Т	}					٦		ξ,J					SHAVE	Т	Т	1				CUAVE	SPANE	Т	25					SHAVE	T					CUANE	Т	Т								

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2020 (16RP7A)	\$5.526	C MEZSON	1/4/1		1/2/10																																	
PANEL# THICKNESS	DATE	WELDOR	INITIAL WIRE		KEPAIK WIKE																					_												
TEMP.F		TEMP F					TEMP F						TEMP F						TEMP F						TEMPF							TEMP F						
TRAVEL (IPM) K . // K . //		TRAVEL (IPM)					TRAVEL (IPM)	11/3	874				TRAVEL (IPM)	77.5	77-3	// 8			TRAVEL(IPM)	11:00					TRAVEL (IPM)							TRAVEL (IPM)						
TIME(SECONDS) TRAVEL (IPM)		TIME (SECONDS)					TIME(SECONDS)						TIME(SECONDS)						TIME(SECONDS)	•					TIME (SECONDS)							TIME(SECONDS)						
VOLTS		VOLTS	1/2				VOLTS	1,7	7				VOLTS	- 47	37	14	\		VOLTS	61	5/	1/2	Ţ		VOLTS							VOLTS						
AMPS 100		AMPS	1/2	1 1	Ī		AMPS	10%	W.				AMPS	106	001	196			AMPS	100	001	100			AMPS							AMPS						
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PANELS TO 17 (18,2068)	l	THICKNESS 200	l	DATE (1-04-78	i -	WELDOR LANGE		INITIAL WIRE C # 18		REPAIR WIRE C T 11																																			
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1 1	5	6/				Г	t/						TRAVEL(IPM)	Т	7	,			T	T	160	7	1			Т	Т	,	/	,		Т	Т						Г	Г					
TIME(SECONDS) TRAVEL(IPM)						TIME(SECONDS) TRAVEL(IPM)							TIME (SECONDS)						No Charles	IME(SECONDS) I KAVEL(IPM)						TIME(SECONDS) TRAVEL (IPM)						100110000000000000000000000000000000000	IIME(SECONDS) I RAVEL(IPM)						TIME(SECONDS) TRAVEL (IPM)						
VOLTS						VOLTS T	20	25	67			 	VOLTS T	သူ	ن روز	70	1	1	┪	T	36	2/5		\dagger		VOLTS T	Т	97	ي ر	30	1	34 10/1	十	Ì					VOLTS						
AMPS	007	001				AMPS V	22)	001	00)				AMPS	0.01	100	201			30777	T	35	Ş	3			AMPS	Ι.	(<i>0</i>)		8	1	ANTOC	Τ						AMPS V						1
PASS 1ST PASS	2ND PASS			STH PASS	6TH PASS	PASS /	1ST PASS	2ND PASS	3RD PASS	4TH PASS	5TH PASS	6TH PASS	PASS	1ST PASS	2ND PASS	3RD PASS	41H PASS	STUDENCE	DACE	1CT DACC	2ND PASS	3RD PASS	4TH PASS	STH PASS	6TH PASS	PASS /	1ST PASS	2ND PASS	3RD PASS	4TH PASS	STH DACC	DAGE	SS	2ND PASS	3RD PASS	4TH PASS	5TH PASS	6TH PASS	PASS //	1ST PASS	2ND PASS	3RD PASS	4TH PASS	STHPASS	61H PASS
SIDE Keot	Post				_	SIDE	Coret	73107	72/07				SIDE	1001	۲	1	$\left. \right $		900	2000	7	1	ł			SIDE	1001	1	1	4		JUI O							SIDE						
R1 WELD	R1 WELD	R1 WELD	RI WELD	RI WELD	RI WELD		R2 WELD	R2 WELD	R2 WELD	R2 WELD	R2 WELD	R2 WELD		R3 WELD	R3 WELD	R3 WELD	K3 WELD	R3 WELD	KS WELD	DA WELD		R4 WELD	R4 WELD	R4 WELD	R4 WELD		LENGTH R5 WELD	RS WELD	RS WELD	RS WELD	AS WELD		LENGTH R6 WELD	R6 WELD	R6 WELD	R6 WELD	R6 WELD	R6 WELD		R7 WELD	R7 WELD	R7 WELD	R7 WELD	R7 WELD	K/ WELD
LENGTH	400						LENGTH	400			•			LENGTH	ડ					FNGTH	φ 7						LENGTH	4,000					LENGTH							LENGIH					
WIDE	دراز						WIDE	20/1						WIDE	1/6					WIDE	091	2011					WIDE	09).					WIDE							WIDE					
DEEP	3						DEEP	10.5						DEEP	107					DEFP	2						DEEP	16001					DEEP							DEEP					
SHAVE	757					SHAVE	GRIND	035				i	SHAVE	GRIND	156				SHAVE	GRIND	0					SHAVE	GRIND	+ 3L				SHAVE	GRIND						SHAVE	GRIND					

PANELS $\pm C18 \Leftrightarrow (18RP7A)$ THICKNESS ± 260	WELDOR A-LIDAC INITIAL WIRE C # 18 REPAIR WIRE C # 18					
TEMP F R-T	TEMP.F	TEMP F	TEMP.F	TEMP F	TEMP F	TEMP F
			FRAVEL (IPM)	TRAVEL (IPM)	IRAVEL(IPM)	RAVEL(IPM)
TIME(SECONDS) TRAVEL (IPM) 1 → 1 ゆ 1 ゆ 1 は	TIME(SECONDS) TRAVEL(IPM) Le Lic Li	TIME(SECONDS) TRAVEL(IPM) パワール パロール パロール パロール	TIME(SECONDS) TRAVEL (IPM)	TIME(SECONDS)	TIME(SECONDS) TRAVEL(IPM)	TIME(SECONDS) TRAVEL (IPM)
vorts ेट वर	volts 26 26 26	VOLTS 20 30 30	VOLTS	VOLTS JC JC JC JC	VOLTS	VOLTS
100 100 100 100	AMPS 100.00 100.0	AMPS (100 (100 (100 (100 (100 (100 (100 (10	AMPS 100 (rec) 100	AMPS (7X)	AMPS	AMPS
PASS 181 PASS 2ND PASS 3RD PASS 4TH PASS 5TH PAS	PASS A STAND PASS A STH PASS A	PASS A STAND PASS A STHER PASS A STHER PASS STREET PASS STRE	PASS / 18T PASS / 2ND PASS 3RD PASS 4TH PASS 5TH PASS 6TH	PASS IST PASS 2ND PASS 3ND PASS 3ND PASS 4TH PASS 5TH PASS 6TH PASS 6TH PASS	PASS IST PASS ZND PASS 3RD PASS 4TH PASS 5TH PASS	PASS IST PASS AND PASS AND PASS AND PASS ATH PASS STH PASS STH PASS ETH PASS ETH PASS
Side Root Root	SIDE	SIDE Per [Per [Zee [SIDE Covel Covel Covel	SIDE Coot	SIDE	SIDE
RIWELD RIWELD RIWELD RIWELD RIWELD RIWELD	R2 WELD R2 WELD R2 WELD R2 WELD R2 WELD	R3 WELD R3 WELD R3 WELD R3 WELD R3 WELD	R4 WELD R4 WELD R4 WELD R4 WELD R4 WELD	RS WELD RS WELD RS WELD RS WELD RS WELD RS WELD	R6 WELD R6 WELD R6 WELD R6 WELD R6 WELD	R6 WELD R7 WELD R7 WELD R7 WELD R7 WELD R7 WELD R7 WELD
LENGTH 4.000	LENGTH 4000	LENGTH 400	LENGTH	LENGTH 4 ACC	LENGTH	LENGTH
WIDE . Kec	WIDE . (₺€	WIDE JUST	WIDE 100	WIDE .	WIDE	WIDE
OEEP - 1000	DEEP . Coo	DEEP	DEEP , 10 8	OEEP 103	DEEP	DEEP
SHAVE GRIND T & C	SHAVE GRIND OSC	SHAVE GRIND T3C	SHAVE GRIND	SHAVE GRIND TS	SHAVE	SHAVE

PANELS $\frac{10.13}{200}$ $\frac{18RP78}{10.200}$ THICKNESS $\frac{1-34.98}{10.200}$	IRE					
ΥEMP.F Κτ	TEMP F WELDOR E. INITIAL W REPAIR N	TEMP F	TEMP F	TEMP F	TEMP F	TEMP F
	TRAVEL(IPM) 1 to 1 to	TRAVEL(IPM) I U I U I U	TRAVEL(IPM)	TRAVEL(IPM)	TRAVEL (IPM)	
TIME(SECONDS) TRAVEL(IPM) / ネ ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	TIME(SECONDS) TRAVEL (IPM) 1 to 1 to	TIME (SECONDS)	TIME(SECONDS)	TIME(SECONDS)	TIME(SECONDS) TRAVEL(IPM)	TIME(SECONDS) TRAVEL (IPM)
VOLTS	VOLTS کار کار کار	VOLTS	VOLTS 30 30 30 30 30 30 30 30 30 30 30 30 30	200 See See See See See See See See See S	VOLTS	VOLTS
AMPS 100 100 100	AMPS (00°)	AMPS (OC)	AMPS JOU JON JON JON	AMPS (EC (DC) (DC)	AMPS	AMPS
PASS 15T PASS 2ND PASS 3RD PASS 4TH PASS 5TH PAS	PASS 1ST PASS 2ND PASS 3RD PASS 4TH PASS 5TH PASS		187 PASS 187 PASS 2ND PASS 3RD PASS 4TH PASS 5TH PASS	PASS / PASS / SUD PASS / SUD PASS / STH PASS	PASS 1ST PASS 2ND PASS 3RD PASS 4TH PASS 5TH PASS	181 PASS 181 PASS 2ND PASS 3RD PASS 41H PASS 51H PASS 61H PASS
SIDE Root Root Zoot	\$10E \$10KF + \$10KF + \$10KF +	Los T Los T Los T	SIDE OVER COVER	SIDE ROOT ROOT ROOT ROOT	SIDE	SIDE
RIWELD RIWELD RIWELD RIWELD RIWELD RIWELD	RZ WELD RZ WELD RZ WELD RZ WELD RZ WELD	R3 WELD R3 WELD R3 WELD R3 WELD R3 WELD	R4 WELD R4 WEL	RS WELD RS WELD RS WELD RS WELD RS WELD RS WELD	R6 WELD R6 WELD R6 WELD R6 WELD R6 WELD	R7 WELD R7 WELD R7 WELD R7 WELD R7 WELD
A COO	A.CCC	A. Bec	A BOC	4.000	LENGTH	LENGTH
WIDE:	WIDE (160	wide , /BC	wide √∫6℃	WIDE (GC	WIDE	WIDE
OEEP , 100	DEEP - IOC	OEEP , OC	DEEP	DEEP .077	DEEP	DEEP
SHAVE GRIND TSL	SHAVE GRIND OCC	SHAVE GRIND TSC	SHAVE GRIND O.S.C.	SHAVE GRIND Toc	SHAVE	SHAVE

Page 1

(16R01A)

16R01A)

HILCKNESS . 200"

Wein I night						И		
x	11 181 111	1	1, 144	Angri	Valis	I ann (Socoust)	Iravel (II'M)	lang (
1/4 1000				0	0		1	0/
9-5		NC	NI) PASS	-	20		2	ŗ
	III WEED	12	I'N) PASS					
	III WI LID	Ş	4111PASS					
	11 W(11)	14	SHUPAGG					
	111 7/110	19	GHIPASS				-	
	(III WI II)	-	HHPASS				-	
	III WI LD	91	BILLPASS					
Wein largiti	11 W(11)	81	IST PASS	88	ત્ર			280
72" 3,5"	ID WITH	NC.	2ND PASS		12			15
	10 WILD	HC 31	JIN PASS				-	
	10 W((0)	41	4TH PASS					
	10 W(10	15	STHPASS					
	10 WI 1D	19	6111 PASS					
	O) IM OI	1	ZHPASS					
	01 IM 211		BTH PASS					
:								
Weln I enquite	01 M LII	51	IST PASS	98	え			200
78" 3.5"	11) W(10)	NC	AND PASS	:	20			3:
	13 WL1D	ນເ	STAD PASS					
	יוז אינוי	117	41H PASS					
	(1) W(1)	115	STHPASS					
	מוזאמנו	119	6111PASS					
	יוז של נוי	11/	7TH PASS					-
	rij WELD	118	BIHPASS					
Welm	14 WLLD	SI	IST PASS	85	20			036
7.2.5"	114 WI LD	2N	2ND PASS	٤ .	77			=
	HA WELD	36.	JAW PASS				-	
	114 WLID	41	41H PASS					
	114 WL1 D	511	STHIPASS					
	114 WE ED	119	61H PASS					
	114 WELD	11.2	THPASS					
	114 WE LD	118	BIHPASS				-	
n Length	115 Wf LD	SI	IST PASS	28	70			986
168 3.5	IIS WELD	2N	2ND PASS		2,			:
	115, WELD	ນເ	วกบ PAGS				_	
	115 WELD	4	4111 PASS					
	17, WLLD	15	SHIPASS					
	115 WI LD	19	6TH PASS					
	HS WITD	71	ZHIPASS					
	115 W(1D)	16	BILLIASS					

(16RO18) PANIL #

1 Juni 1 280 180 29. 150 = HIIKKHESS . 200 " 6.235 11.00 11.00 I min (Seconds) C.ik; 20 9 शत 2 202 Volts 23 Stuv 85 00 00 85 28 Ξ IST PASS IST PASS 4111 PASS ZHPASS IST PASS STATHE ZHEPASS BTHPASS JIN PASS 2NU UNS STATIBLE 2NO PASS JFIO PASS 61HPASS 2ND PASS STAD DAGS JUL PASS GTHPASS MINASS BIHPASS 4TH PASS 6111 PASS 7111PASS IST PASS JIW PASS 41HPASS STHPASS 61HPASS 4TH PASS STHIPASS ISI PASS STHPASS BIHPASS 2ND PASS 41HPASS STHPASS 7111 PASS BIHIPASS BIHPASS ---GI IM III 111 WI 113 (1) W((1) (11 W) 11) (1) W(1) 10 W(11) U WI ID 01 W(U) 114 WI 1D 115 WI 1D 111 WELD OT IM ILI UL WELD 115 WF [1] (1) W(1) U W(10 01 IM (1) 01 M (1) 114 WE LD 01 JM FI 114 W(10 UI WELD OT IN SIE 0 W(10 (I) M(I) 01) W(1) US WILD US WILD E WILD U. WILD O I M 17 WE ED 11 W(10 U1 WI 1D 013W10 (1) WELD 011W FIL IN WILD II. WILD 1. 20 " 3.5 " 1 3.5 T 173" 35"

2 2

Court 102"

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1, and 1) 100 1

lenp (280 738 250 **3**₩. 6.23-57 THICKINESS . 200 113vel (II'M) I and (Socarate) Cale. 2 22 38 82 2 7 85 20 85 85 3 (16ROZA) Picc 151 PASS 2ND PASS JAW PASS JI RU PASS IST PASS THEASS THURE SYVAHID IST PASS STILPASS BTHPASS IST PASS 2ND PASS STHPASS 6TH PASS 7111 PASS BIHPASS 4111 PASS 61H PASS THIPASS BIHPASS 2ND PASS 4111 PASS STILLPASS GTHPASS 7111 PASS BTILLYASS ZHHPASS PASS (INS STAN UNE SALINASS 2ND PASS 4TH PASS 6111 PASS THPASS SZYY CUTE 41H PASS IST PASS SEAT OFF STILLPASS PANEL # ş 11 W 110 11 WI 10 O DW CI III WELD 115 Wf LD 11 W 11) 01 IM 01 U WI (I) 10 WI 10 H WELD 11 WELD III WELD (1) W (1) (1) M(1) U W(10) 01 JM MI UI WILD 115 W(1 D 115 WI (1) E, WILD 01 JM A 013W 41 112 WI LD U) WI ID (1) W(1) U) W(I) 01 M FI IN WELD US WILD US WILD E WID 115 W(LD III WELD DI ME ED 14 WE LD Cont 102" 165" 3.5 172" 254 ADT (01" -171" 3.5

THEKNESS (16R02B) PANIL

200,

280 250 184 784 760 05C נ ζ (M.II) local 6.235 lana (Socorate) t h d સ્ R 0 2 7 21 2 Volts 74 × 100 25 85 85 28 4TH PASS 151 PASS SSA'I UNS 2ND PASS JUD PASS STRPASS BIHPASS ZEVATILIZ BTHPASS NU PASS ISI PASS 151 PASS 61H PASS IST PASS GIHPASS IST PASS CHIPASS THEFASS BIHPASS PND PASS JUU PASS THPASS GIHPASS THIPASS JAND PASS STHPASS THIPASS 2ND PASS SIMPASS THPASS 2ND PASS STAD PASS SPAGHIS STHIPASS SHIPASS STHPASS BILLPASS 4111 PASS BIHPASS 41HPASS 1 II WI ID 913% 11 III WILD 114 WL1D 11's W(11) III WILL 11 W(11) U W((I) U W(U) U WIID OLIW MI 14 WELD 115 WE LD US WELD 05 WI 10 DE WELD 01 IM C11 II) W(II) IN WLID 115 Wf [1) 115 WI LD U WELD U111W 01 U W(10) D WILL 117 WELD GI JM LI 01 W (1) UI WELD 01 JW (10 113 WLLD 01 JA (1) 113 WELD OT IM HI 01 W M 114 WE LD IS WILD (14 WF ED 15" 3.5 1 sight Good 102" 174" 105" Wein لممر المعلى المعلى

(16R03A) PANIL #

26 26 76, 260 26.27 76. 2 6-24-57 ((ave) ((1))) HIKKNESS ane (Socouts) ().ir 22 20 20 20 20 750 A 20 20 58 56 58 200 20,20 86 4TH PASS 2NU I'ASS 4TH PASS SAN DASS 151 PASS STAULT 61HPASS 2ND PASS JIND PASS 4111 PASS STHPASS THPASS IST PASS NU PASS JAN PASS 6TH PASS JUD PASS STHPASS 2ND PASS JUD PASS 4111 PASS STHPASS PASS OFF BTHPASS 41H PASS STILPASS BIHPASS ISI PASS THPASS THEPASS 6111 PASS STHPASS BIHPASS BITEPASS IST PASS 7111 PASS IST PASS 11 W 11 11 WI 10 411 948 119 O M III II WITE U W(10) U WILD 01 JM 21 01 IM 21 () M () O I W CI (1) W(1) III WELD U) W(() H) WLLD III WELD 114 WLLD U WED IN WELD GI IM PL UN WELD 115 Wf (1) 01 W 71 U W(10) U WELD U W(10) 01)W 01 IN WILD DI WELD 1) W(L() M WEIO 15 W/ LD 01 W 20 JIA WELD Weln Length 3<" Cast 106" 177" 3.5" 100 CENTERIO ON 8" CENTEREDON B' CENTERED ON 6" Cossk 103" 175" CINTCKEDON 8" Root 102" 172" LEWIRED ON B" Rest 103" 117

ZHIPASS

6TH PASS

E. WILD IIS WILD BTHPASS

US WELD

26. **%**% 26° 26. HIKKNESS . 200 6-24-97 11.3ml (11.14) I mm (Socoute) U.ik: 20 207 20 72 7 20 7 58 98 58 288 96 88 200 KO10 B (16,8038) 151 PASS PND PASS MINNE 2NO PASS JAN PASS 7TH PASS OTH PASS 4TH PASS 2ND PASS JUD PASS STHPASS THPASS GHIPAGS ZHUPASS JUD PASS THPASS JAND PASS 6TH PASS STHPASS 6111PASS JEED PASS THIPASS BILLPASS IST PASS 6111 PASS BIHPASS IST PASS 4111 PASS SEMPMSS 7111 PASS BIHPASS IST PASS 2NI) PASS THEPASS IST PASS 2ND PASS 4TH PASS STHPASS BIHPASS STHPASS PANIL # ă. 01 M 110 01 JW 51 115, WI 1D (1) W(1) 115 W/ 1D US WILD (I) W(I) O) IM III OI MIII (1) WI (1) U WID U WILD U) W(I) (1) WELD UI MAID 01 JM HI UN WELD 115 WE (1) 115 WI LD 11 WELD (1) W((1) U WELL) (1) W(1) OT IM EL 113 WL(1) 01 W (1) 114 WI [L] 01 JW 11 HA WELD 115, WI 113 15 WI 10 (1) W (1) U WIII 01 JM CI 113 WELD H) WELD 01 W 11 IN WILD l might 3.S. 1 ngth 3.6" I sngih Rest 103" 173" Root 109" 173" Costa 107"

28 36. 22 HIRCKNESS 200" 6-24-57 11.3vel (11.14) lann (Socoud) 2 20 7 20 7 7 28,5 98 28 288 288 58 (16R04A) FEL PASS ZND PASS WW PASS GIHPASS PND PASS SPAY UNE 2ND PASS STHPASS 4TH PASS STHPASS STATITO BTHIPASS ZHUPASS JUD PASS BIHPASS 2ND PASS BIHPASS JOO PASS 41H PASS STHPASS THPASS BIHPASS IST PASS 41H PASS 7111 PASS STHPASS THPASS 2ND PASS HHPASS SZVJHIB BIHFASS 6TH PASS IST PASS THIPASS ISI PASS HIPASS IST PASS SYN PASS 4111 PASS PANIL # ¥. III WI III ILL WELD 0 M II 10 W(10) IIS WELD UIS WILD IF, WILD 11 W(10 11 WI 11 111 74110 U WILD 10 W(10) OT IM CIT O) W(I) (1) W(1) 01 M MI 114 WL1D IN WELD 114 WE LD UL WILLD US WELD UI WELD 1D W(10) (1) W((1) (I) W(I) 013W(1) ווז אגנוו (1) W((I) IN WLLD IN WELD OT IM CD 114 WELD 01 IM 11 U W(10 () W(() 113 WELD 114 WI 1 D IN WILL 105" Voin | 101911 1 S.S. 3.5 lergih 171. Rest 103" Weln 1 Exar 100" Gura 103"

John C 222 36. 76. 200" 3-42-9 113vel [11'11) HIKKNESS lanto (Socorate) C.de 200 74 200 8 2 (22 Volls 335 25 533 2000 (16R048) MINDAGS JITO PASS 4111 PASS STATIFIE SPATHE ZHPASS JIND PASS 6111 PASS 2ND PASS ISI PASS STHPASS BTHPASS 2ND PASS JOHN PASS STILPASS 6TH PASS BTHPASS 2ND PASS ZTHPASS ISTPASS 7111 PASS THPASS 151 PASS 2NU PASS BIHPASS STHPASS JAND PASS STHPASS BIHPASS 2ND PASS JUD PASS 6TH PASS 4111 PASS GHEPASS IST PASS 4TH PASS BILLPASS 4TH PASS ATHERASS IST PASS PANIL P ŧ 01 M(10 III WELD 115 WI LU III WEID (I) W(II) III WIII (11 M 11) 01 W 10 (1) WI (1) 10 W(10) U WILL U WI 1D OI IM LI 01 JM 71 115 Wf LD 117 WILD יוז אינוי D WLLD II) WELD 113 WELD וא ארום UI WELD (1) WE (1) 114 W(1D US WILD 0 WI 10 IE, WELD 11. W(11) OT JAS SH 11 WI 10 U W (1) 01 JW 01 (1) W(1) 01 JM FI UN WEID 15, WELD 112 WELD DI WELD US WELD 7.5-1 173" 3.5" 172 1 3.5 .. Length المال المال المال 1.00 J. C. 1, 102 " LOZ" (Cours 106" Part 101: Kest 102" Dur.',

2014 19.11 Weln length 2.5"		(4 2007)					
		(150701)			Cole	1-26-57	
102" Waln Waln	4	1,100	Anys	Volts	3		
102" 170" wile 170"	11 W(10)	151 PASS	58	200	ī	1	2°
105" Well 175" 173" 1941 1941 1941 1941 1941 1941 1941 194	113 WLID	2ND PASS	85	20		7.	72.
103" Well (1991) 1991 (1991) 1	111 WELD	JIW PASS					
175 175	UI WELD	4111 PASS					
105. 172. Well	III WITD	THUPASS					
103" Waln Waln Waln Waln Waln Waln Waln Waln	III WITE	GIHPASS					
103" Waln 1991 1991 1991 1991 1991 1991 1991 19	(II WH II)	THPASS					
105" Waln	III WEED	85VJ1110					
105" 172" 173" 174" 174" 174" 174" 174" 175" 17	C W(10	1SI PASS	25	30		C	9
103" (173") (173") (174) (175") (175")	ī	2ND PASS	200	2 -		,,	7,400
173" Wells	Ī	JIW PASS				-	
173" (Vela (173")	U W(1D)	4 TH PASS					
173" (Vala (GI IM QI	STHPASS					
103" (173" 173" 173" 173" 173" 175	10 W(10)	61HPASS					
103" Vale	112 W(10	THIPASS					
173" Well Well 173"	112 WE LD	8TH PASS					
103" Vale	1						
Web Web	O I M CO	151 PASS	200	7		Z'Č	74.0
11-00 Well 1751	T	COLLINGS.	g ,	77			•
1120 Visio 1009	10 W(10	JUD PASS					
1.104 Wile	0 m	STATILITY					
1901 View 1009	OT)M (II)	SVAHIS					
12C1 1901.	II) W(II)	7111 PASS				-	T
1201 Vila 1019	ri) WELD	BIHPASS					
1201 Vila							
1.561.1.190.1	114 WLID	IST PASS	98	20		74.	
	114 WE 1D	2ND PASS	28	70		7	240
	II WI ID	JFUD PASS					
	14 W(10	4111PASS					
	IN WILD	STILPASS					Ĭ
	C) M M	61HPASS					
	מוז אגנום	THPASS					
	III WELD	BIHIPASS			-		
und Deep Wein Length	O JM SIG	IST PACE	60	6		C	0
10.	Ī	2ND PASS	200	7		70	2%
	Γ	JAD PASS		1			
	IIS WITD	4111 PASS					
	115 WL1D	STHIPASS					
	115, W(11)	GHRPASS					
	16, W(1D	ZHIPASS					
	115 W(1D)	BILLPASS					

	PANIL #	F012 B			HICKNESS	. 38	
		(16ROSB)	8		Date	C3-52-Y	^
		-36'15	γιλυγ	Volts	3	liavel [fill)	1 ems
with the Web (might	01 M II)	151 PASS	28	20			77
Rust 1.105" 174" 3.5"	HI WILL	2ND PASS	82	7			20
	11 W(10)	HU PASS					
	III WI ID	4TH PASS					
	(11 W(11)	SHEPASS					
	111 W(110)	GHIPAGS					
	111 WI 11)	ZYMINZS					
	ווו או ונו	BIHPASS					
1	(1) W(1)	IST PASS	35	20			72
GAK 103 137 3.5"	ID WITE	2ND PASS	28	2,			5
	ID WILL	JIID PASS					
	10 W(10)	HIHPASS					
	DWID	STHPASS					
	D WILD	61HPASS					
	112 WF 10	THIPASS					
	II WELD	BIHPASS					
2000	1000	101	20	6			
170 100		121170	200	22			77
-1.67.1.1.201-	(1) (1)	ZND PASS	BZ	2			74
	13 W(10	JUD PASS				_	
	III WELD	41H PASS					
	D) W(f()	STHPASS					
	(1) W(1)	61HPASS					
	II) W([[)	71H PASS					-
•	113 WELD	BIHPASS					
		-					
- 1	111 WI 1D	IST PASS	85	٥٥			かし
CANCAL 100 1.177" 3.5"	114 WI (f)	2ND PAGS	28	7 0			360
	114 WI (1)	JEWD PASS					
	01 M 110	4111PASS					
	114 W(10)	STHPASS					
	GI JM MI	61HPASS					
	114 W[10	7111 PASS					
	114 WELD	BIHPASS					
L							
le roll	ווז אינוו	1ST PASS	28	20		F	74
. 103" .116"	US WITD	2ND PASS	85	2 (30
	IIS WI ED	JRD PASS					
	IIS WITD	4TH PASS				/	
	115 WI 1 D	STHPASS					
	HS WITH	6111PASS					
	III. WELD	ZHEPASS					
	115 W(10)	BIHFASS					

. 200°.	6-25-87	Liavel (IF'M)	i i		/ 770		7					740	. 56 /	240												•																	
HICKNESS	Date:	Volts [Socout)	٥ <u>٥</u>	٦٠	21							20	3)	2 \																													
50128	(16ROSB)		58		IND PASS 58	4111 PASS	SHIPPES	GIIIPASS	7111 PASS	BIHPASS			2ND PASS 58	JIND PASS 58	4111 PASS	STHPASS	6111 PASS	7111 PASS	BIHPASS	151 PASS	2ND PASS	JUD PASS	41H PASS	STIIPASS	6TH PASS	SSVdHII	BIHPASS	IST PASS	SMI) PASS	3110 PASS	4111 PASS	STILIPASS	6111 PASS	THPASS	BIHPASS	IST PASS	2ND PASS	JUD PAGS	AHIPASS	SIIIPASS	61HPA55	THIPASS	BTHPASS
ויאאו		of ne.					III WILLI			III WI (I)			D WITD	U WILL)	ID WILLD			17 WI 10	011M 211	11 WI 10		113 WI 10		11) W(10)	9 (11)M(1)			114 W(1)							114 WELD		15 WI 10	IIS WELD			II; W[1])	115, WL1D	115 WELD
110		j	With William W	./74 3.5	= -	<u> </u>		= -			l	', and Ihay Wela lorgili	5,			171	<u>a</u>	Vai	121	Well Well Well I will I will	181		1111	100	1111	A E I	•	Fried then Weln Longin 114 V	\ E	<u> </u>	Val.	==		<u> </u>		 treed then Waln tength 115 v	1431	181	151	141	V S1	<u> </u>	1311

Date 6-17-97 HIKKNESS . 200" (162P1A) PANIL .

		11,11			ī		
1			o C	Volls	I min (Socolute)	(M.II) Javes	lamp f
0 - 11 - 11 - 1		C.V. 16.	0	२			767
701 1707	EL WILD	PACS PAGS	3	22			;
	11: W(10)	111U PASS					,
	ITE WELD	4TH PASS					
	111 W(1)	STATILLE					
	01174 11	6111PAS3					
	III WIID	71111755					
	111 WE (1)	BTHPASS					
The second secon							
then I may Make I might	10 W(10)	1SI PASS	86	g			240
(cultic 1:10.3" 1.18" 3.5"	(11 IM 0)	2NO PASS	:	20			:
•	(I) JM av	JIND PASS					
	01 IM 01	ATHPASS					
	10 W(10	STHPASS					
	10 W(10)	6fH PASS					
	112 WELD	ZHPASS					
	01 IM CII	BTHPASS					
١	() I M LI	151 PASS	40	05			.56
Reat 1.15" 1.177" 2.5"	113 W(11)	2ND PASS	11	20			:
	UTWILD	JUD PASS	8	2.1			5
	יוז שבום	ATHPASS					
	II) WI LD	STHPASS					
	113 WELD	6TH PASS					
	וואענונ	7TH PASS					
	II) WELD	BTHPASS					
Wefn	114 WI LD	1SI PASS	53	20			720
	IN WILD	2ND PASS	٠	16			230
	IN WELD	SEAN ONE	11	21			730
	IN WELD	ATHEPASS					
	114 WE 1 D	STHPASS					
	114 W(1D	6TH PASS					
	IN WELD	THPASS					
	IN WELD	BTHPASS					
	3 3 3 7 3 7		00	(0176
1 20 20 20 20 20 20 20 20 20 20 20 20 20		101101	27.0	37			/7
105 1.70 1.3.5	IR WITD	2ND PASS	:	20			:
	II'S WE LO	JUD PASS	٤	20			1,
	ris wr tu	4TH PASS					
	115 WELD	STHIPASS					
	115 WI [1]	61HPASS					
	115. WI 110	ZHPASS					
	115 W(1()	BTHPASS					

THEKNESS . 200" (16RP1B)

								Oute	6-17-	21
-:	i			· it bo	221	Anyre	Volts	I ann (Socaret)	(M'U) Invest	lamp f
the training the t	45.5	l neugh)	(1) W(1)		151 PAG	26	20			24.
207 104"	.770	3.8	tti WI ID		2ND PAGS	۲	00			:
			יוו אינונו		WW PASS					
			111 WI (D		4TH PASS					
			III WI III		STHPASS					
			111 WEED		GHIPASS					
			111 W(11)		MILIPASS					
			TH WELD		BIHPASS					
i judi	در. ۲	110	11 WE LED		IST PASS	38	20			066
Currel .101"	172	3.5.	ID WITE		2NO PASS		20			=
			ID WILD		JIW PASS					
			ום אוננט		4111PASS					
			01 JM 21		STHPASS					
	-		U WILD		6111 PASS					
			112 W(10		7111 PASS					
			112 WELD		BTHPASS					
10.00	3	IIO.	(1) W(1)		IST PASS	500	00			.66
×1.103"	129.	3.6	113 W(11)		2NO PASS	:	2 (:
			01 W(1)		3710 PASS	٠	20			:
			113 WELD		41H PASS					
			113 WF LD		STILPASS					
			113 WLLD		61H PASS					
			II) WELD		7111 PASS					
•			ns weld		BIHPASS					
Parp	Viele	lorgh	11 WI 10		ISI PASS	85	20			22.
CM. 121	Q	~	IN WILD		2ND PASS	-	20			, , , ,
			III WILD		JPD PASS	1,	25			730
			114 WELD		41H PASS					
			III WLID		STHPASS					
			114 WI LD		61H PASS					
			114 WELD		THPASS					
			IN WELD		BIHPASS					
Derp.	Wein	Length	115 Wf LD		IST PASS	28	20			740
"mt 1.10?"	171	3.6	HS WITD		2ND PASS	;	۶ /			
			IIS WILD		JPD PASS	:	၁၀			٠,
			115 WE 1.D		4111 PASS					
			115 WI LD		SHIPASS					
			115, WI 110		61HPASS					
			11: W(10		THIPASS					
			IIS WI LD		BTHPASS					

(16RPZA) PANIL #

1 June 1 720 34. 250 240 : ; : : 5-11-9 HIKKNESS 200" I ravel (II'M) mo (Socouds) Unite 200 20 2c 20 20 20 202 2 2 2 500 8 5 ; = 28 83 : Ξ ; : 2NU IMSS 4TH PASS STATIFIE STH PASS 6TH PASS 7TH PASS FIPASS BIHPASS STREPASS 6TH PASS 2ND PASS 4111 PASS 71H PASS **BIH PASS** SSV4 OUG GILLPASS 2ND PASS OND PASS 4TH PASS JUD PASS STAD DASS 6TH PASS ZENTASS THPASS IST PASS THPASS 151 PASS 3FID PASS THPASS BIHPASS IST PASS STHPASS **ETHPASS** IST PASS 2ND PASS 4TH PASS BTHFPASS BIHPASS 2ND PASS STILLPASS ıkkı. O) IM III U WITD 11 WE 10 UI WILL O IM III UD WILLD (1) W((1) 01 JW 01 (1) W(1) (1) W(1) 11 WELD 112 WF 1D IN WE LD DI WELD US WELD US WILD U) W(I) HI WELD 13 WELD IS WILD UN WILLD 0 W(10) U W(10) 013W 41 O I M CI (1) W(1) 01 JW [1] 113 WELD IN WLLD HA WLID UN WELD OI JM SH IIS WILD US WILD 115 WELD SI WILD IN WELD O JAM NI HA WELD 115 WELD length 7.511 (i ergili 1. 1. 77 3. 6 1. 3.5 % .168" loot 162" Cw84 . 103" (outh 101"

p.u.s

(16RP2B) PANIL #

HIKKNESS 200"

73.0 17 C 240 240 .46 : : : 2 . 6-17.57 M. III INCE mn (Secouth) 250 000 26 200 20 20 2 द 20 Volts Name: 28 58 58 1 28 = : : = -7 THU PASS P PC IST PASS ZND PASS THEPASS IST PASS 2ND PASS 61H PASS 71H PASS 2ND PASS JUD PASS SHIPASS 2ND PASS 2ND PASS 41H PASS 4TH PASS BTHPASS BIHPASS STHPASS 41H PASS IST PASS STITPASS 4TH PASS GTHPASS IST PASS JAN PASS STHPASS STHPASS BTHPASS ISI PASS SSAY ONE **STH PASS** JEND PASS STHIPASS BIHPASS GHIPASS THPASS 711117ASS 4TH PASS BIHPASS THPASS ŧ II WITE 111 WI 113 10 WE LD ונז אלנם וא אנום (1) WE (1) 11 WI 10 (I) M (I) UJ WE UI IN WELD US WILD Koat 1.108" 172" 35" HIWIII OT IM ILI מווא מו () W(1) 01 JM 21 113 WELD 114 WE LD IN WELD IN WELD 01 JM 51 UI WELD 01 JM 2 01 JM (1) 01 JM LI UI WELD 11) WELD TH WELD IN WLID IIS WELL OLIN SI 01 JW 511 115 WI 11) IIS WILD 115 WI 1D (I) M((I) 113 WELD מו זאינונ Length 3.5 Length 3.5° 1 5,5 181 172 .173 Vefa 104" 10, 10, 10 V

Reut .

(0.15/4 . 103

Cao T

(16RP3A) PANEL !

1 pmp f 240 200 240 36 ; 6-18-57 I tayof (II 'M) ور د. د min (Socouth) Cir 7 20 ر و 2 श्रत 26 ŝ 2 Volts Sylvania Sol 8 200 88 20 ٤ **-**2ND PASS 4111 PASS 711117ASS JIN PASS 1ST PASS BIHPASS 2ND PASS STO PASS 2ND PASS JFIU PASS SZVJ H19 JOD PASS THEPASS 2NO PASS 4TH PASS BILLPASS THPASS STRPASS BTHPASS THU PASS STATILITY STHPASS 61H PASS 7111 PASS IST PASS 511117ASS ISI PASS 6111 PASS 71H PASS BIHIPASS 4TH PASS STHPASS 4111 PASS STHPASS 2ND PASS 4TH PASS 61111755 IST PASS BIHPASS IST PASS ·H. 01 JW 11 ID WELD III WI ID 115 WI [1] P. WILD (11 W) 11: (1) W((1) 11 W(L() (11 JM Q) 01 JM 21 U WI LD 01 JM 617 01 JM 01 112 WELD 17 WILD 11) WE 11) (1) WELD 01 W (I) 114 WE LD 115, WI 1D OF AN IS TH WELD U WILD 01 IM 0 013W(10 113 WELD 111 WI LD 114 WI LD H4 WELD OT IM SI IIS WI ID 115 WELD F. WILD IIS WILD U) W(I) III WELD IN WELD 168" 3.5 14 170" 3.5" 35% Res 1.105" 177 3.5" length i ergili

Care they

Vared Day

HIKKNESS . 200"

(16RP3B)

038)

HIIKKNESS 2001

			`		:::C	(-01-5	^	
	od)10	ا , ادر	Ληψις	Volts	I min (Soconds)	I ravel (II'M)	트	
. r.d tr.p. W.tn Inegth	(II WITE)	151 PASS	28	25		1 2	240	
B.T . 104"1.176" 3.5"	111 WELD	2ND PASS	:	7		1	-	
	111 WELD	WU PASS						
	(1) W(()	4TH PASS						
	111 W(11)	STRIPASS				<u> </u>		
	111 W(11)	SPATILIA				<u> </u>		
	111 W(11)	ZHPASS						
	th WELD	BIHPASS						
:						_		
2	10 WF(D)	IST PASS	58	20			240	
Cont. 102" 1.13 35"	12 W[1])	2ND PASS	1	20			:	
	(1) M (1)	JIND PASS						
	ID WELD	4TH PASS						
	U WILD	STHPASS						
	(D W(1))	61H PASS						
	01 W CH	ZTHPASS						
	01 M 211	BTHPASS				_		
Trend Dony Weln I hadil	ULMILLD	IST PASS	28	ე _ი			.46	
 	(1) W(1)	AND PASS	:	21			:	
	(1) W(1)	JUD PASS						
	H) WELD	41H PASS						
	111 WILD	STHPASS						
	(I) W(I)	61H PASS						
	113 WILD	7111 PASS						
•	(13 WELD	BIHPASS						
Valo I profits	III WLID	1ST PASS	98	20			20.	
(Court 103 1701 3.5"	01 M H1	2ND PASS	•	2 .			:	
	114 WF LD	JAD PASS				_		
	114 W(10)	41H PASS						
	III WEID	STHIPASS						
	III WI ID	6TH PASS						
	IN WELD	THPASS						
	III WELD	BTHPASS						
Land Deep Waln Length	\neg	1ST PASS	83	20		/	240	
.61. 1.03	1	2ND PASS	=	70			W.	
	115, W(1D	JPU PASS						
	115 W(10	4TH PASS						
	115 WI 1D	STHIPASS						
	115, W(11)	61HPASS				/		
	15, WI 1D	7TH PASS						
	HS WEED	BTHPASS						

Itemp ! 046 240 , hC 240 : : (5-81-9 HILKNESS , 200" (W.II) Invest I min (Socottebr) Ç. 20 202 200 2 20 25 2 ć 98 35 98 98 58 (16RP4A) Part PARS IST PASS IST PASS BIHPASS STHPASS STHPASS 71H PASS STILPASS 7111 PASS 4TH PASS 4TH PASS PAU UNS TRU PASS 2ND PASS 3HU PASS 8111 PASS IST PASS BTHPASS 61H PASS BIHPASS STAD PASS STRUBER SPAGHID ZIHITASS IST PASS 4111 PASS 6111 PASS 71H PASS 2NU PASS 3rio PASS 7111 PASS SSVJ OHC 41H PASS STHPASS 4111 PASS 6TH PASS BTHEPASS **6THPASS** PANIL # ÷ 11 WE 10 011W(1) IN WELD 011W III (1) W((1) UI WIII) 01 IM III UN MILD 01 JW 01 01 W H UI WELD UI WELD 12 W(10) 112 WI LD III WEID U) WELD ווז אנום 11 W LD 114 WF LD IN WLID GI JM PI IIS WILD 013W 211 011W 21 IS WILD U WILD 01 JW 41 01 IM 01 01 JM 21 13 WEED 113 W(11) OJ JW (F) IN WELD 115 WE LU US WELD US WELD 100 T 101" Well Ingli 3.5" 103" 173" 3.5" Co. 12 104" 175" 3.5" I ength 100 1771. 1081. Col 14 105" Reat !

16KP4B) PANIL #

THICKNESS . 200"

	~		16RP4B)			Unte	5-81-9	٠, ٢	
		· erfe:	Par	Anys	Volts	funn (Socniets)	leavel (11.14)	5	
Weto Kenglin	11 WI 1D		IST PASS	33	20		11-66	240	
Part 1.106"1.178" 5.5"	nı wıın		2ND PASS	, د	١ ٦				
	'11 WELD		JTU PASS				،		
	in with		THPASG						
	013W 11		SHIPASS				-		
	111 WI II		GHIPASS						
	111 W 110		THEFASS						
	OJ W ID		BIHPASS						
=	ID WELD		ISI PASS	æ	20			016	
"3.5" 3.5" 3.5"	10 WI 10		2ND PASS	•	21				
	10 W(1)		JIW PASS				/		
	10 W(10)		4TH PASS	į			\		
	17 W(10)		STHPASS						
	10 WI ID		6TH PASS				\		
	112 W(1D		THPASS						
	112 WELD		BIHPASS						
Veln earth	U WEID		IST PASS	28	20			24.	
1.101.1.19	113 W(10)		AND PASS	:	20			.,	
	(1) W(1)		JRD PASS						
	יוז שבום		41H PASS						
	113 WELD	-	STHPASS				/		
	113 WELD		6TH PASS						
	יוז שינוי		7TH PASS					-	
	מוז אה נוז		BIHPASS						
With Longits	114 WLLD		IST PASS	58	20			026	
Carrel 101" 173" 3.5"	IN WILD		2ND PASS	•	21			:	
	14 WF LD		3FID PASS						
	TH WELD		4111 PASS						
	114 W(10		STHPASS						
	14 W(LD		61H PASS				1		
	114 WE 1 D		THPASS						
	וא אנוס		BIHPASS						
Veln (englh	115 WELD		IST PASS	28	20			240	
102	rts WELD		2ND PASS		200			:	
	IIS WILD		3TIO PASS						
	115 W(1D		4TH PASS						
	115 WF1D		STITPASS						
	45 W(1D		GTHPASS						
	115 WI 1D		THPASS						
	US WILD		BTHFIASS				-		

Itomp I 240 240 2,6 ٤ HICKNESS . 200 6-19-57 Iravel (IFW) 8-11 I min (Socoute.) Date: Z S 20 202 87 200 16RPSH) 28 28 58 0 a 2000 225 58 58 SAN UNG SHIPAGE THU PASS 151 PASS 7111 PASS BIHPASS IST PASS 2ND PASS JUU PASS IST PASS 2ND PASS IST PASS 313D PASS HIII PASS STHUPASS THIPASS 4TH PASS STHPASS 6111 PASS BTH PASS STYD PASS STHPASS 6TH PASS THIPASS BIHPASS PASS (INS 41HPASS STHPASS 4TH PASS PANIL ž. III WI LD (1) W((1) OI WELD U WITD 111 WI 110 IN WELD U W(1) 17 WI 10 01 JW C11 () W(I) II) WELD 01 JM (1) OI WHID III WELD U WIII U WILD 01 JM 21 U WIID DI WELD IB WEID 01 JW (1) (1) WELD 11) WE LD 113 WELD 134 WI LD 14 WF U) 01 JM MI IN WEID 1 ergili 2, 5 ' 3.5 " 3.6. 100.0 1.1651 Cale 1031 (curk 102"

BIHIPASS 61H PASS THPASS 14 WF LD IN WELD DI METO

240

Ø

200

IST PASS 2ND PASS SPAC DAS

> US WELD 01 JW 217

Length 3-5'

104" (68

المعالم المعالم

115 WF LD

4TH PASS STILPASS 6THPASS

115 WI 1 U H5 WILD ZIHPASS

115 WI 11) 115 W(1D BTHPASS

IIS WILD

7

240 240 lemp f 240 74. (4 HIKKNESS , 200" 25-51-5 1 (14) 8-11 ane (Socouts) C.ite Volts 20 22 44 2 ~ 207 220 28 500 S 200 FOUZY (16 RP5B) TH PASS IST PASS PND PASS ZHIPASS JAND PASS 2ND PASS JAN PASS HIPASS 2111114SS 3110 PASS 41H PASS STHPASS 61H PASS 7111 PASS BIHPASS 151 1755 4111 PASS STHPASS 6TH PASS ZHPASS BIHPASS 2ND PASS 3FID PASS STHPASS GHIPASS THIPASS BTHPASS SPATHIB BIHPASS 2ND PASS STHPASS 6111 PASS SAYO CASS THIPAGE ISI PASS 4TH PASS BIHPASS IST PASS THEPASS PANIL يَّدِ لا IN WILD III WITE O M II III WELD U WI (I) 01 IM 01 113 WE LD H WEID II4 WE LD US WELD IF, WELD 11, WI 11) 11' W(10 O IM III O I M II UN WILLD 112 W(10 01 W C1 01 W(1) 01 JW (1) 11 WE 10 III WELD מו זאי נוי ווז שנום 013W MI 013W 11 US WELD 115 WE LD OT JAK SEL O M(IO 0 JM 0 U W 11 (11 W/ LI) 115 WE LD (1) WELD IN WELD 3.5 101 172 251 Length 3.5 Weln | 10011 3.8 l ergilt 123. 5.5 1, and 11, my Cura 103" 100 Cost

111KKNESS . 200 " (17801A)

		4.7	1,16	Schoy	Volts	1 mp (Soconde)	I tayed (II'M)	6
	11 (VI 11)		151 PASS	85	29		2-7-	2,0
"tr. "101.	11 W 10		2ND PASS	85	g		1	0/6
	111 WE10		JIND PASS					
	111 W(11)		HHPASS				1	
	111 WILL		STATIFIE					
	11 (4/11)		GHIPASS				-	
	111 W 11)		27HH7					
	OT MITE		BIHPASS					
	-						-	
Wefn	10 W(10)		1SI PASS	58	51			720
JER 1. 103" 1.175" 3.5"	(U W(11)		2ND PASS	25	न्द			720
	ID WELD		JAND PASS					
	10 W(10		4TH PASS				\ 	
	01 JM 21		STHPASS				 	
	O WITE		GHIFASS					
	013W CD		/III PASS				<u> </u>	
	01 IM 21		BIHPASS				-	
13r of	OH MILLO		IST PASS	36	30			720
Rut 1.101" 1.172" 3.5"	113 W(11)		2HO PASS	28	20			220
	III WI I D		JAND PASS					
	113 WELD		4TH PASS					
	11 W(11)		STHPASS					
	III WEED		6TH PASS					
	01 W(10		THIPASS					-
	113 WELD		BIHPASS					
dela lergih	IH WILD		ISI PASS	98	20			230
	114 W(11)		ZNI) PASS	96	20			220
•	514 WELD		JEED PASS					
	114 WELD		AHIPASS					
	HA WELD		STHPASS				-	
	GI M NI		61H PASS					
	114 W(11)		THPAS				_	
	114 WLLD		BIHPASS					
12.0	(15 WF (1)		IST PASS	86	26			240
Kat 1.109" 1.176" 3.5"	115 WI 1D		2ND PASS	18	20			20,0
	JP. WI 10		STAD PASS	58	20			740
	CHS WITO		4111 PASS					
	115 WELD		STIIPASS				_	
	115 WE 119		GHIPASS				-	
	115 W(1D)		THIPASS				-	
	13. W.	_	02401114					

HILKINESS 200 " MALLI FOLZ A
(17ROIA)

							ī	7, 2, 2	
			Z.		Ī	Volts	I min (Socoute)	I tavel (11'M)	1 ժամ
ul-M	200	11 WI 10			78				.77
150 151.	۱,	OT WITE	:.1	2ND I'ASS	28				.46
Circle of the section	_	III WELD	'''	NU PASS	88				211
٠ ١	`	(1) W((1)	38.		65				0,'6
ON MARKY.		(11 M 11)			1				
4 6 45 5 x to fill		111 8/1110		GHIPASS					
1103	Lereth	III WELD		ZHPASS					
	_	III WI LD		BHIPASS					
1.6									
Den. Wejn	argili	יט אינוט		ISI PASS					
		וט אענו)		2NO PASS					
		וה אונו		JPD PASS					
		וט אינוט		4TH PASS					
		01 JM 41		STHPASS					
		ID WITD		6111 PASS					
		112 WELD		ZHIPASS					
		112 WI LD		BIHPASS					
Drop. Wein	l engills	וואנוי		IST PASS					
		III WEED		NO PASS					
		(11 W(11)		JAND PASS					
		מושא נוי		41HPASS					
		11) W(L)		STHPASS					
		ונו אנונו		6TH PASS					
		III WEED		7111PASS					_
		113 WELD		BIHPASS					
	٠								
1 (1)	111010	HI WILD		IST PASS					
		114 WI 1D		2ND PASS					
		IIA WELD		31W PASS					
		III WI LD		41HPASS					
		III WELD		STHPASS					
		114 WI LD		61H PASS					
		114 WELD		71H PASS					
		114 WE LD		BIHPASS					
I)crt	lengih	115 WF LD		IST PASS					
		115 WELD		2ND PASS					
		11's WI 1D		SIND PASS					
		115 Wf 1 D		4111 PASS					
		115 WLLD		SHIPASS					
		115 WI 1D		GTHPASS					
		115 W(1D)		7111PASS					

(178018)

111KKNESS . 200"

DAR 6-26-5)	20 (9-11 2) 13avi (11'M) 10nip 1						20	70.							720				-		33							0,50						
3	1711 1745 5 8 Volts 78 1711 1745 5 8		STREATE	GHPACS	THUAS	8111 PASS	ISI PASS 78	- 88	JEW PASS	4TH PASS	STHPASS	VIIIPASS	9111 PASS	26	38	SECTION SECTIO	STHPASS	61HPASS	ZHIPASS	BIHPASS	+	285	ATHPASS	STRIPASS	6111 PASS	71H PASS	BIHPASS	98	88	58	4III PASS	SMAN	THE PACE	SVI IIV
AT INVII	101 101 102 102 3.5 " 11 WITH	•	OT MACH	th WILD	111 W(11)	G) M II	Dag. Wefa Lery	٧,		10 WID		Olim ai	II) WILD	 Deep Weln Templi	7		(11 JW (1)	ווואונוו	U1) W(1)	rij WELD	3	. S. E . 3.5	11 MH10	ווז אווו	QI IM PII)	ווא און ווא		Weln length	11.10'C1.15C1 3.5' 115WID	IIS WILD	Ollwish	33	N SE	G A S

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(17R02B) WANTE B

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£015A (17R03A) PANIL

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1 on p 1 73. 220 730 22, 720 22. HIKKNESS . 200" 6.22.5 11-5 (M. f) javei win (Socouty) U.A: 25 20 200 3 ८० ٧) 7 Volts 28 5 20 S 58 58 28 200 FOISB (17R03B) 2NU PASS JPU PASS 2ND PASS 6TH PASS 7HU PASS STHPASS 151 PASS 4111 PASS SHIPAGE 2ND PASS BILLPASS 3FID PASS STHPASS 7111 PASS ISI PASS STATIONS HIIPASS IST PASS BTHPASS BIHPASS GIIIPASS ZHIPASS BUHPASS STHPASS THIPASS JAN PASS STHPASS 6TH PASS THPASS IST PASS 2ND PASS SEVA ONE CHIPASS THIPASS IST PASS RILLPASS 61HPASS 41H PASS BILIPASS STHIPASS PANILE ·nh (1) W(1) 11 WI 10 10 W(10) ILD WILLS 112 W(1D US WILD (I) W(I) III WI ED (U) W((I) 11, WI 1D II WELD (III WI II) U WILD O MIID (1) W((1) 01 JM (1) (1) W(1) 114 WELD 115 W(10 US WELD IIS WILD O) W(I) מוש אנוו OI M III 0) W 0 O) IM (I) 0138610 U) WELD IN WILD CH WILD (1) W HI U WLID 01 IM 11 01 W 110 115 WF [1] US WILLD CE WILD 01 JW (1) 01 JM HI Length 7.5 R 3.5 1 argili. l ergth 1.561 .173" 10 2" 119" fort . 106" (wir | .103" Carra 105" F 69 p.a.s.

10np f 72 720 730 2/2 723 720 220 6.27-57 . 200 . 11-6 HICKNESS une (Socouts) C.it 20 9 200 دردر 43 5 268 588 838 28 5.8 500 Se FO16A (17R04A) 151 PASS 2ND PASS TRU PASS JIKO PASS 71H PASS BHI PASS 2NO PASS 4111 PASS IST PASS 2ND PASS STHPASS 2ND PASS STHPASS 6111 PASS 7111 PASS 2ND PASS STHPASS 4TH PASS STATIFIE STAD PASS ZHPAS FILPASS 22 ATHUS BIHPASS IST PASS 4111 PASS 6TH PASS STAD DITE STHUMSS BIHPASS SEN PASS 4TH PASS 61HPASS ZELLPASS BTHPASS ISI PASS THIPASS STHPASS BIHPASS IST PASS I'ANI L 3 1D W(11) 01 W 11 112 WELD 013W 111 (1) W(1) TI WELL 11 WI 10 (1 M) (1) O) IM II 117 WI LD O I M CU III WEED OLIW MIL III WEID OT IM FI 11 W(10 115 WI 1D F. WIID O IM III (1) W(1) U WILL 01 JM 21 U W(10 U WIID UT WELD U) W(II) 114 WL1 D (1) W((I) 114 WI LD DI MELD OT IM SII OLIM SH US WILD US WILD 11, WI ID 115, W(1D) 113 WE LD E ME 01 JW (1) Aport . 105" . 174" 3.5" Root 101" 170" 3.5" i ergili (2) 106" Waln 10 Care 104" 1.178

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PANEL # 18-12044

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18-RP48

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1111CKHFS5 0.800"

OKIDES

PANTLI 18-RP54

1111CKHTS5 0.200"

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APPENDIX E NON-DESTRUCTIVE EVALUATION

LMMSS, MSFC DIVISION

#16R01

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195- 0 200",2195P/2195P,VPPA.

VERTICAL, R5-5", SHAVED

Welded Panel ID: F008

Split Panel: N/A

Test Date: 6/24/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

X-Ray Unit: Phillips 220

Acceptance Specification: For Information Only

Film No: 6

X-Rayed By: J Smith X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 78

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A & B

Frame	View	Status	Discrepancy	
Α	1	INFO ONLY	NO INDICATIONS NOTED	_
Α	2	INFO ONLY	NO INDICATIONS NOTED	
Α	3	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	
В	2	INFO ONLY	NO INDICATIONS NOTED	
В	3	INFO ONLY	NO INDICATIONS NOTED	

PI = Penetration Line L Por = Linear Porosity LP = Lack of Penetration LF = Lack of Fusion UC = Undercut OI = Oxide Inclusion C = Crack UF = Underfill HI = Heavy Inclusion CC = Crater Crack BT = Burn Through CS = Cold Shut Por = Porosity EΡ = Excessive Penetration Sh = Shrinkage

Technician

Date

6-24-97

NONDESTRUCTIVE EVALUATION BRANCH

SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

16R01

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200",2195P/2195P,VPPA,

VERTICAL, R5-5", SHAVED

Test Date: 6/24/97

Specification Used: For Information Only

Welded Panel ID: F008

Split Panel: N/A

Weld Area: REPAIR

Planished:

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: REPAIR AREA A & B

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY \boxtimes

REPAIR A (RT)- CRACKLIKE INDICATIONS FROM 4 1/4" - 8 1/4". (LT)- 6" - 7 1/2". REPAIR B (RT)- CRACKLIKE INDICATIONS FROM 17 1/4" - 20 1/4". (LT)-

16 1/2" - 20 1/4".

ROOT PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

REPAIR AREA A (RT)- CRACKLIKE INDICATIONS FROM 4 1/4" - 8".(LT)- 4 1/4" - 8". REPAIR B(RT)- CRACKLIKE INDICATIONS FROM 16 3/4" - 19 1/2".

(LT)- 16 1/2" - 19 1/2".

LMMSS, MSFC DIVISION

#16R01

				10/00/
Project:	Misc Test			
Project Description:	ALTERNATE FIL VERTICAL, R5-5			2195P/2195P, VPPA,
Test Date:	6/24/97	Specification Us	ed: For Infor	mation Only
Welded Panel ID:	F008	Split Par	iel: N/A	
Weld Area:	REPAIR	Planished:	Other Pro	cess: SE
Area Repaired:	N/A Repair	Level A: 5	Level B: 5	Level C: 0
Material Type:		Mate	rial Thicknes	s: 0.200 "
Penetrant Type/Method:	I/A	Test 1	Technician: 、	J. Smith
Penetrant System Used:	MANUAL		Contact:	Johnny Dingler
Requesting Organization	: MMC/NASA		Penetrant:	Ardrox P6F4
Sensitivity Group:	Ш		Developer: !	N/A
Wash:	Water			
General Comments:	SANDED AREAS	ONLY		
	DISC	REPANCY		
COVER PASS				
Discrepancy: INI	FORMATION ONL	. Y		
NO INDI	CATIONS AFTER	ONE SAND		
ROOT PASS			-	
Discrepancy: INI	FORMATION ONL	. Y		

Technician () Ann

NO INDICATIONS AFTER ONE SAND

Date (6-24-97)

LMMSS, MSFC DIVISION

#16R02

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE, 0 200", 95P/95P, VPPA, VERT., R5-5", FL,

70%P, SHAVED

Welded Panel ID: F009

Split Panel: N/A

Test Date: 6/23/97

Weld Area: REPAIR

Planished: Other Process: N/A

Level C: 0

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: D. Newman

Film No: 6

X-Ray Interpreted By: D. Newman

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 80

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A & B ONLY.

Frame	View	Status	Discrepancy
A	1	INFO ONLY	NO INDICATIONS NOTED.
Α	2	INFO ONLY	NO INDICATIONS NOTED.
Α	3	INFO ONLY	NO INDICATIONS NOTED.
В	1	INFO ONLY	NO INDICATIONS NOTED.
В	2	INFO ONLY	NO INDICATIONS NOTED.
В	3	INFO ONLY	NO INDICATIONS NOTED.

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician David Newmon

Date <u>6-23-97</u>

LMMSS, MSFC DIVISION

#16R02

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE, 0.200", 95P/95P, VPPA, VERT., R5-5", FL,

70%P, SHAVED

Test Date: 6/24/97

Specification Used: For Information Only

Welded Panel ID: F009

Split Panel: N/A

Weld Area: REPAIR

Planished: ☐ C

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: D. Newman

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: INSPECTED REPAIR AREAS ONLY

DISCREPANCY

COVER PASS

Discrepancy:

CRACK LIKE INDICATIONS NOTED AT 8.75" - 10.5", 16.125" - 16.75" & 19.75" -

20.25", LEFT SIDE OF WELD.

CRACK LIKE INDICATIONS NOTED AT 8.0" - 9.75", 16.25" - 17.75" & 18.75" -

19.75", RIGHT SIDE OF WELD.

ROOT PASS

Discrepancy:

CRACK LIKE INDICATIONS NOTED AT 6.5" - 6.75", 8.125" - 9.75", 14.5" -

15.75" & 16.75" - 20.0" LEFT SIDE OF WELD.

CRACK LIKE INDICATIONS NOTED AT 6.5" - 8.0" - 9.75" - 10.25" & 16 5" -

18.0", RIGHT SIDE OF WELD.

Technician David Newman

Date 6-24-97

LMMSS, MSFC DIVISION

#16R02

Project:	Misc Test			
Project Description:	ALTERNATE FILL 70%P, SHAVED	.ER WIRE ,0.200	',95P/95P, V	/PPA, VERT., R5-5", FL,
Test Date:	6/24/97 S	pecification Use	d: For Info	rmation Only
Welded Panel ID:	F009	Split Pane	el: N/A	
Weld Area:	REPAIR I	Planished: 🔲	Other Pro	cess: SE
Area Repaired:	N/A Repair L	.evel A: 5 L	evel B: 5	Level C: 0
Material Type:	2195 AL-LI	Materi	ial Thicknes	ss: 0.200 "
Penetrant Type/Method:	I/A	Test Te	echnician:	J. Smith
Penetrant System Used:	MANUAL		Contact:	Johnny Dingler
Requesting Organization	: MMC/NASA	F	Penetrant:	Ardrox P6F4
Sensitivity Group:	111	D	eveloper:	N/A
Wash:	Water			
General Comments:	REPAIR AREA A 8	& B SANDED ARE	EAS.	
	DISCR	REPANCY		
COVER PASS				
Discrepancy: 🔲 INI	FORMATION ONLY	(
NO INDI	CATIONS AFTER C	ONE SAND.		
ROOT PASS				
	FORMATION ONLY	(
NO INDI	CATIONS AFTER C	ONE SAND.		

Technician fin

Date 6-24-97

LMMSS, MSFC DIVISION

16R03

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%,SHAVED

Welded Panel ID: F010

Split Panel: N/A Test Date: 6/25/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 78

FFD: 42 in.

Time: 30 sec.

Comments: REAPAIR AREAS A AND B

Frame	View	Status	Discrepancy	
A	1	INFO ONLY	NO INDICATIONS NOTED	
Α	2	INFO ONLY	NO INDICATIONS NOTED	
Α	3	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	
В	2	INFO ONLY	NO INDICATIONS NOTED	
В	3	INFO ONLY	NO INDICATIONS NOTED	

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line LF = Lack of Fusion UC = Undercut OI = Oxide Inclusion = Underfill C = Crack UF HI = Heavy Inclusion = Burn Through CC = Crater Crack BT CS = Cold Shut = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician

Date 6-2(-9)

LMMSS, MSFC DIVISION

#16R03

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195P - 0.200",2195P/2195P,VPPA.,

VERTICAL, R5-5", FL, 70%, SHAVED

Test Date: 6/25/97

Specification Used: For Information Only

Welded Panel ID: F010

Split Panel: N/A

Weld Area: REPAIR

Planished:

Area Repaired: N/A

Repair Level A: 5

Other Process: N/A

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

 \square

Developer: N/A

Wash: Water

General Comments: REPAIR A AND B

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

REPAIR A (RT)- CRACKLIKE INDICATIONS FROM 7 1/4" - 9" AND FROM 9 1/2" - 10". (LT) 6 1/2" - 9 1/2". REPAIR B- (RT) - CRACKLIKE INDICATIONS

FROM 18" - 19 1/2". (LT)- FROM 16" - 19 1/2".

ROOT PASS

. Discrepancy:

INFORMATION ONLY M

REPAIR A (RT)- CRACKLIKE INDICATIONS FROM 6 1/4" - 9 1/4". (LT) - FROM 6 1/4" - 9 1/2". REPAIR B (RT)- CRACKLIKE INDICATIONS FROM 16" - 17"

AND FROM 18 1/4" - 19 1/2". (LT) - 16 1/4" - 19 1/2".

LMMSS, MSFC DIVISION

#16R03

Proj	ect: Misc Test			
Project Descript		TE FILLER WIRE FOR ., R5-5", FL, 70%, SHA		2195P/2195P, VPPA,
Test Da	ate: 6/26/97	Specification Us	sed: For Inform	ation Only
Welded Panel	ID: F010	Split Pa	nel: N/A	
Weld A	rea: REPAIR	Planished: 🔲	Other Proce	ess: S1
Area Repair	ed: N/A R	Repair Level A: 5	Level B: 5	Level C: 0
Material Ty	pe: 2195 AL-LI	Mate	erial Thickness:	0.200 "
Penetrant Type/Meth	od: I/A	Test [*]	Technician: D.	Newman
Penetrant System Us	ed: MANUAL		Contact: Jo	hnny Dingler
Requesting Organiza	ition: MMC/NAS	SA	Penetrant: Ar	drox P6F4
Sensitivity Gro	up: III		Developer: N/	A
Wa	sh: Water			
General Comme	nts: INSPECTE	D SANDED AREAS OF	NLY.	
		DISCREPANCY		
COVER PASS				
Discrepancy:	INFORMATIO	N ONLY		
NO I	INDICATIONS N	OTED AFTER SANDIN	IG ONCE.	
ROOT PASS				
Discrepancy:	INFORMATIO	N ONLY		
NO I	INDICATIONS N	OTED AFTER SANDIN	NG ONCE.	

LMMSS, MSFC DIVISION

#16<u>R04</u>

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 -

0.200",2195P/2195P,VPPA,VERTICAL,R5-5", FL,70%P,SHAVED

Welded Panel ID: F011

Split Panel: N/A Test Date: 6/25/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A Repair Level A: 5 Level B: 5 Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

Film No: 6 X-Rayed By: J. Smith

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 78

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A AND B

Frame	View	Status	Discrepancy	
A	1	INFO ONLY	NO INDICATIONS NOTED	
Α	2	INFO ONLY	NO INDICATIONS NOTED	
Α	3	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	
В	2	INFO ONLY	NO INDICATIONS NOTED	
В	3	INFO ONLY	NO INDICATIONS NOTED	

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Date 6-25-9

LMMSS, MSFC DIVISION

#16R04

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195P-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%,SHAVED

Test Date: 6/25/97

Specification Used: For Information Only

Welded Panel ID: F011

Split Panel: N/A

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5 Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: REPAIR AREA A AND B

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

REPAIR A (RT) CRACKLIKE INDICATIONS FROM 4 1/2" - 7 1/4". (LT)- 5" - 7 1/2". REPAIR B (RT)- CRACKLIKE INDICATIONS FROM 17" - 19 3/4". (LT) 17

1/2" - 20".

 \boxtimes

ROOT PASS

Discrepancy:

INFORMATION ONLY \boxtimes

REPAIR A (RT)- CRACKLIKE INDICATIONS FROM 5" - 7 1/2". (LT)- 4 1/2" - 6" AND FROM 7 1/4" - 8 1/4". REPAIR B (RT)- CRACKLIKE INDICATIONS FROM

16 3/4" - 20". (LT)- 16 1/2" - 17 1/2".

W Smc Date 625-87

LMMSS, MSFC DIVISION

#16R04

Project:	Misc Test			
Project Description:	ALTERNATE FILLER WIRE FOR 2195P - 0.200", 2195P/2195P, VPPA, VERTICAL, R5-5", FL, 70%, SHAVED			
Test Date:	6/26/97	Specification Used	d: For Info	rmation Only
Welded Panel ID:	F011	Split Pane	I: N/A	
Weld Area:	REPAIR	Planished: 🔲	Other Pro	cess: S1
Area Repaired:	N/A Repair	Level A: 5	evel B: 5	Level C: 0
Material Type:	2195 AL-LI	Materia	al Thicknes	ss: 0.200 "
Penetrant Type/Method:	I/A	Test Te	chnician:	D. Newman
Penetrant System Used:	MANUAL		Contact:	Johnny Dingler
Requesting Organization	: MMC/NASA	Р	enetrant:	Ardrox P6F4
Sensitivity Group:	111	De	eveloper:	N/A
Wash:	Water			
General Comments:	INSPECTED SA	NDED AREAS ONL	Υ.	
	DISC	REPANCY		
COVER PASS Discrepancy: INI	ORMATION ON			
NO INDICATIONS NOTED AFTER SANDING ONCE.				
ROOT PASS				
Discrepancy: INI	FORMATION ON	LY		
NO INDI	CATIONS NOTE	AFTER SANDING	ONCE.	

LMMSS, MSFC DIVISION

#16R05

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200",2195P/2195P, VPPA,

VERTICAL, R5-5", FL, 70%P, SHAVED

Welded Panel ID: F012

Split Panel: N/A

Test Date: 6/25/97

Weld Area: REPAIR

Planished: Other Process: N/A

rest Date. 0/25

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film S

Film Size: 4.5" X 17"

MA: 10

KV: 78

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A & B

Frame	View	Status	Discrepancy
A	1	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	OXIDE LINE 0.100" AT 17 1/2" LOCATION. OXIDE LINE 0.120" AT LOCATION 18 3/4" IN EXCESS OF STP5508.

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion UF = Underfill HI = Heavy Inclusion C = Crack CC = Crater Crack BT = Burn Through CS = Cold Shut Por = Porosity EP = Excessive Penetration Sh = Shrinkage

Technician

Date (- 25-97

LMMSS, MSFC DIVISION

#16R05

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200", 2195P/2195P, VPPA,

VERTICAL, R5-5",FL, 70%, SHAVED

Welded Panel ID: F012

Split Panel: N/A

Test Date: 6/25/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 6

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 76

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A & B

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	NO INDICATIONS NOTED
Α	2	INFO ONLY	NO INDICATIONS NOTED
Α	3	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	ISOLATED OXIDES/ POROSITY NOT IN EXCESS OF STP5508.
В	2	INFO ONLY	SAME AS VIEW 1
В	3	INFO ONLY	SAME AS VIEW 1

LP = Lack of Penetration LPor = Linear Porosity PI = Penetration	Line
LF = Lack of Fusion UC = Undercut OI = Oxide Inclus	ion
C = Crack UF = Underfill HI = Heavy Inclu	sion
CC = Crater Crack BT = Burn Through CS = Cold Shut	
Por = Porosity EP = Excessive Penetration Sh = Shrinkage	

Technician

Date

6-25-97

LMMSS, MSFC DIVISION

#16R05

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200",2105P/2195P,VPPA,

VERTICAL, R5-5",FL, 70%, SHAVED

Welded Panel ID: F012

Split Panel: N/A

Test Date: 6/25/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 0

Level B: 7

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 3

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 8" X 10"

MA: 10 KV: 78

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA B ONLY

Frame	View	Status	Discrepancy
В	1	INFO ONLY	ISOLATED POROSITY/OXIDES NOT IN EXCESS OF STP5508.
В	2	INFO ONLY	SAME AS VIEW 1
В	3	INFO ONLY	SAME AS VIEW 1

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Date

LMMSS, MSFC DIVISION

#16R05

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200".2195P/2195P. VPPA.

VERTICAL, R5-5", 70%, SHAVED

Test Date: 6/26/97

Specification Used: For Information Only

Welded Panel ID: F012

Split Panel: N/A

Weld Area: REPAIR

Planished: □

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 7

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: REPAIR AREA A & B

DISCREPANCY

COVER PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

REPAIR A (RT) - CRACKLIKE INDICATION FROM 6" 7 1/2". (LT) - 5 1/2" - 7 1/2". REPAIR B (RT) - CRACKLIKE INDICATIONS FROM 16" - 19 3/4". (LT) - 16

1/4" - 19 1/2".

ROOT PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

REPAIR A (RT)- CRACKLIKE INDICATIONS FROM 4 1/4" - 8". (LT) - 4 1/4" - 5 1/2". REPAIR B (RT)- CRACKLIKE INDICATIONS FROM 16 1/4" - 191/2". (LT) -

16" - 17".

Technician

Date 6-26-97

LMMSS MSEC DIVISION

+11005

	EMMSS, MSI C DIVISION	# 16KUS
Project:	Misc Test	
Project Description:	ALTERNATE FILLER WIRE FOR VERTICAL,R5-5", FL, SHAVED	2195 - 0.200",2195P/2195P, VPPA,
Test Date:	6/30/97 Specification Us	ed: For Information Only
Welded Panel ID:	F012 Split Par	nel: N/A
Weld Area:	REPAIR Planished:	Other Process: SE
Area Repaired:	N/A Repair Level A: 5	Level B: 6 Level C: 0
Material Type:	2195 AL-LI Mate	rial Thickness: 0 200 "
Penetrant Type/Method:	I/A Test 1	Technician: J. Smith
Penetrant System Used:	MANUAL	Contact: Johnny Dingler
Requesting Organization	: MMC/NASA	Penetrant: Ardrox P6F4
Sensitivity Group:	III	Developer: N/A
Wash:	Water	
General Comments:	SANDED AREAS ONLY.	
	DISCREPANCY	
COVER PASS		
Discrepancy: IN	FORMATION ONLY	
NO INDI	CATIONS AFTER ONE SAND	
ROOT PASS		

Discrepancy:

INFORMATION ONLY

NO INDICATIONS AFTER SECOND SAND

Date 6.30.97

LMMSS, MSFC DIVISION

16RP1

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195- O.200", 2195P/2195P, VPPA,

VERTICAL, R5-5", FL, 70%P, SHAVED

Welded Panel ID: F003

Split Panel: N/A Test Date: 6/18/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5 Level

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type:

X-Ray Unit: Phillips 220

Acceptance Specification: For Information Only

Film No: 2

X-Rayed By: J. Smith X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 77

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A AND B ONLY

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	NO INDICATIONS NOTED

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line UC = Undercut OI = Oxide Inclusion LF = Lack of Fusion UF = Underfill C = Crack HI = Heavy Inclusion BT = Burn Through CC = Crater Crack CS = Cold Shut = Excessive Penetration Por = Porosity EΡ Sh = Shrinkage

Technician

Date

6-18-97

LMMSS, MSFC DIVISION

16RPI

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%P,SHAVED

Welded Panel ID: F003

Split Panel: N/A Test Date: 6/19/97

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A Repair Level A: 5 Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 79

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A AND B

Frame	View	Status	Discrepancy	
A	1	INFO ONLY	NO INDICATIONS NOTED	
Α	2	INFO ONLY	NO INDICATIONS NOTED	
Α	3	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	
В	2	INFO ONLY	NO INDICATIONS NOTED	
В	3	INFO ONLY	NO INDICATIONS NOTED	

LP = Lack of Penetration LF = Lack of Fusion

UC = Undercut

PI = Penetration Line

C = Crack

UF = Underfill

OI = Oxide Inclusion HI = Heavy Inclusion

CC = Crater Crack Por = Porosity

BT = Burn Through = Excessive Penetration

L Por = Linear Porosity

CS = Cold Shut Sh = Shrinkage

Technician

Date 6 - 19 - 97

LMMSS, MSFC DIVISION

Repair Level A: 5

#16RP1

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%P,SHAVED

Test Date: 6/19/97

Specification Used: For Information Only

Welded Panel ID: F003

Split Panel: N/A

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Gerry Bjorkman

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: REPAIR AREAS A AND B

DISCREPANCY

COVER PASS

Discrepancy:

 \square INFORMATION ONLY

CRACKLIKE INDICATIONS REPAIR AREAS A AND B

ROOT PASS

Discrepancy:

 \square

INFORMATION ONLY

CRACKLIKE INDICATIONS REPAIR AREAS A AND B

Date (g-19-9)

LMMSS, MSFC DIVISION

#16RP1

Project	Misc Test				
Project Description:	ALTERNATE FILLER WIRE FOR 2195 - 0.200",2195P/2195P,VPPA,VERTICAL,R5-5",70%P,SHAVED				
Test Date:	6/19/97	/97 Specification Used: For Information Only		rmation Only	
Welded Panel ID:	F003	Split Panel: N/A			
Weld Area:	REPAIR	Planished: 🛛	Other Pro	cess: S2	
Area Repaired:	N/A Repair	r Level A: 5	Level B: 5	Level C: 0	
Material Type:	2195 AL-LI	Mater	ial Thicknes	ss: 0.200 "	
Penetrant Type/Method:	I/A	Test T	echnician:	J. Smith	
Penetrant System Used:	MANUAL		Contact:	Gerry Bjorkman	
Requesting Organization	n: MMC/NASA		Penetrant:	Ardrox P6F4	
Sensitivity Group:	111	i	Developer:	N/A	
Wash:	Water				
General Comments:	SANDED AREA	SONLY			
	DISC	CREPANCY			
COVER PASS					
Discrepancy: IN	IFORMATION ON	ILY			
NO IND	ICATIONS AFTER	R SECOND SAND			
ROOT PASS					
Discrepancy: IN	IFORMATION ON	ILY			
NO IND	ICATIONS AFTER	R ONE SAND			

Technician Warms Date 6-19-97

LMMSS, MSFC DIVISION

#16RP2

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL, R5-5",FL,70%P, SHAVED

Weided Panel ID: F004

Split Panel: N/A Test Date: 6/18/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5 Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

5 AL-LI

Wire Type:

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 2

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 78

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A AND B ONLY

Frame	View	Status	Discrepancy	
A	1	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	

LP = Lack of Penetration

LP or = Linear Porosity

PI = Penetration Line

LF = Lack of Fusion

UC = Undercut

OI = Oxide Inclusion

C = Crack

UF = Underfill

HI = Heavy Inclusion

CC = Crater Crack

BT = Burn Through

CS = Cold Shut

Por = Porosity

EP = Excessive Penetration

Sh = Shrinkage

Technician

10)

Date (-/8-97

LMMSS, MSFC DIVISION

#16RP2

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%P,SHAVED

Welded Panel ID: F004

Split Panel: N/A Test Date: 6/19/97

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 77

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A AND B

Frame	View	Status	Discrepancy	
A	1	INFO ONLY	NO INDICATIONS NOTED	
Α	2	INFO ONLY	NO INDICATIONS NOTED	
Α	3	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	
В	2	INFO ONLY	NO INDICATIONS NOTED	
В	3	INFO ONLY	NO INDICATIONS NOTED	

Technician

Date (--19-9)

LMMSS, MSFC DIVISION

#16RP2

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%P,SHAVED

Test Date: 6/19/97

Specification Used: For Information Only

Welded Panel ID: F004

Area Repaired: N/A

Split Panel: N/A

Weld Area: REPAIR

Planished: 🖂 Other Process: N/A

Level B: 5

Repair Level A: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Gerry Bjorkman

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: |||

Developer: N/A

Wash: Water

General Comments: REPAIR AREA A AND B

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

CRACKLIKE INDICATIONS REPAIR AREA A AND B

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACKLIKE INDICATIONS REPAIR AREA A AND B

Technician $\frac{1}{2}$ Date $\frac{(4-7-9)}{2}$

LMMSS, MSFC DIVISION

#16RP2

Project:	Misc Test				
Project Description:	ALTERNATE FILLER WIRE FOR 2195- 0.200,2195P2195P,VPPA,VERTICAL,R5-5",FL,70%P,SHAVED				
Test Date:	6/19/97 Specification Used: For Information Only				
Welded Panel ID:	F004 Split	004 Split Panel: N/A			
Weld Area:	REPAIR Planished:	Planished: 🛛 Other Process: SE			
Area Repaired:	N/A Repair Level A: 5	Level B: 5 Level C: 0			
Material Type:	2195 AL-LI M	aterial Thickness: 0.200 "			
Penetrant Type/Method:	I/A Test Technician: J. Smith				
Penetrant System Used:	MANUAL	Contact: Gerry Bjorkman			
Requesting Organization	: MMC/NASA	Penetrant: Ardrox P6F4			
Sensitivity Group:	III	Developer: N/A			
Wash:	Water				
General Comments:	SANDED AREAS ONLY				
DISCREPANCY					
COVER PASS	EODMATION ON V				
	FORMATION ONLY				
NO INDI	CATIONS AFTER ONE SAND				
ROOT PASS					
Discrepancy:	FORMATION ONLY				

Technician Date 1,-19-92

NO INDICATIONS AFTER ONE SAND

LMMSS, MSFC DIVISION

#16 RP3

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%P,SHAVED

Welded Panel ID: F005

Split Panel: N/A Test Date: 6/19/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: 4043

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 2

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 40

Film Size: 4.5" X 17"

MA: 10

KV: 76

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A AND B

Frame	View	Status	Discrepancy	
A	1	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	

L Por = Linear Porosity LP = Lack of Penetration PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion UF = Underfill C = Crack Hi = Heavy inclusion вт = Burn Through CC = Crater Crack CS = Cold Shut = Excessive Penetration EΡ Por = Porosity Sh = Shrinkage

Technician

Date 6-18-97

LMMSS, MSFC DIVISION

#16RP3

Program Name: Wide Panel Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 -

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",70%P,SHAVED

Welded Panel ID: F005

Split Panel: N/A Test Date: 6/23/97

Weld Area: REPAIR

Planished: M Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: 4043

X-Ray Unit: Phillips 220

Acceptance Specification: For Information Only X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 40

Film Size: 4.5" X 17"

MA: 10

KV: 79

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A AND B

Frame	View	Status	Discrepancy	
A	1	INFO ONLY	NO INDICATIONS NOTED	
Α	2	INFO ONLY	NO INDICATIONS NOTED	
Α	3	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	
В	2	INFO ONLY	NO INDICATIONS NOTED	
В	3	INFO ONLY	NO INDICATIONS NOTED	

LP = Lack of Penetration LF = Lack of Fusion

L Por = Linear Porosity UC = Undercut

PI = Penetration Line

OI = Oxide Inclusion

C = Crack

UF = Underfill

HI = Heavy Inclusion

CC = Crater Crack

BT = Burn Through

CS = Cold Shut

Por = Porosity

EP = Excessive Penetration

Sh = Shrinkage

Technician

Date (-23-97

LMMSS, MSFC DIVISION

#16RP3

Project: Misc Test

Project Description: 0.200", 95P/95P, VPPA, VERTICAL, R5-5", FL, 70%P, SHAVED

Test Date: 6/23/97

Specification Used: For Information Only

Welded Panel ID: F005

Split Panel: N/A

Weld Area: REPAIR

Planished: ⊠

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: D. Newman

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: REPAIR AREAS A & B ONLY.

DISCREPANCY

COVER PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED AT 6.5" - 8.0" & 16.5" - 19.75", LEFT SIDE

OF WELD.

CRACK LIKE INDICATIONS NOTED AT 6.0" - 8.0" & 18.5" - 20.0", RIGHT

SIDE OF WELD.

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED AT 5.5" - 7.75", 16.375" - 16.9" & 18.0" -

19.75" LEFT SIDE OF WELD.

CRACK LIKE INDICATIONS NOTED AT 4 0" - 8.25" & 16.0" - 20.0", RIGHT

SIDE OF WELD.

Technician David Meuman Date 6-23-97

	LIVIVISS,	WISEC DIVISION		16KP3	
Project:	Misc Test				
Project Description:	0.200",95P/95P, VPPA, VERTICAL, R5-5", FL, 70%P, SHAVED				
Test Date:	6/24/97 Specification Used: For Information Only			rmation Only	
Welded Panel ID:	F005 Split Panel: N/A				
Weld Area:	REPAIR	Planished: 🖂	Other Pro	cess: SE	
Area Repaired:	N/A Repair	Level A: 5	Level B: 5	Level C: 0	
Material Type:	2195 AL-LI Material Thickness: 0.200 "		ss: 0.200 "		
Penetrant Type/Method:	I/A Test Technician: J. Smith		J. Smith		
Penetrant System Used:	MANUAL		Contact:	Johnny Dingler	
Requesting Organization	: MMC/NASA		Penetrant:	Ardrox P6F4	
Sensitivity Group:	Ш		Developer:	N/A	
Wash:	Water				
General Comments:	SANDED AREAS	SONLY			
DISCREPANCY					
COVER PASS					
Discrepancy: INI	FORMATION ON	LY			
NO INDI	CATIONS AFTER	R TWO SANDS.			
ROOT PASS					
Discrepancy: INI	FORMATION ON	LY			

Technician Date 6-24-97

NO INDICATION AFTER ONE SAND.

LMMSS, MSFC DIVISION

#16RP4

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%P,SHAVED

Welded Panel ID: F006

Split Panel: N/A Test Date: 6/19/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5 Level B: 0

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: 4043

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 2

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 76

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A AND B

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	NO INDICATIONS NOTED

LP = Lack of Penetration

L Por = Linear Porosity

PI = Penetration Line

LF = Lack of Fusion

UC = Undercut

OI = Oxide Inclusion

C = Crack

UF = Underfill

HI = Heavy Inclusion

CC = Crater Crack

BT = Burn Through

CS = Cold Shut

Por = Porosity

EP = Excessive Penetration

Sh = Shrinkage

Technician

Date (e-19-97)

LMMSS, MSFC DIVISION

#16RP4

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 -

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,70%P

Welded Panel ID: F006

MA: 10

Split Panel: N/A Test Date: 6/23/97

Weld Area: REPAIR Planished:

⊠ Other Process: N/A

Area Repaired: N/A Repair Level A: 5 Level B: 5

Level C: 0

Time: 30 sec.

Material Type: 2195 AL-LI

Material Thickness: 0.200 " Wire Type: 4043

Acceptance Specification: For Information Only X-Ray Unit: Phillips 220

> X-Rayed By: J Smith Film No: 6

X-Ray Interpreted By: J. Smith Film Type: KODAK M

> Film Size: 4.5" X 17" Density: 2.0 - 4.0

> > FFD: 42 in.

Comments: REPAIR AREAS A AND B ONLY

KV: 79

Frame	View	Status	Discrepancy
A	1	INFO ONLY	NO INDICATIONS NOTED
Α	2	INFO ONLY	AREA OFABRUPT DARKER DENSITY CHANGE AT 4 1/4" LOCATION (UNKNOWN)
Α	3	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	NO INDICATIONS NOTED
В	2	INFO ONLY	SAME AS FRAME A VIEW 2 BUT AT 16" AND 19 1/2"
В	3	INFO ONLY	NO INDICATIONS NOTED

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Date 6-23-97

LMMSS, MSFC DIVISION

#16RP4

Project: Misc Test

Project Description: 0.200", 95P95P, VPPA, VERTICAL, R5-5", FL, 70%P, SHAVED

Test Date: 6/23/97

Specification Used: For Information Only

Welded Panel ID: F006

Split Panel: N/A

Weld Area: REPAIR

Planished: ⊠ Otl

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5 Le

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: D. Newman

Contact: Johnny Dingler

Penetrant System Used: MANUAL

Penetrant: Ardrox P6F4

Requesting Organization: MMC/NASA

Developer: N/A

Sensitivity Group: |||

Wash: Water

General Comments: REPAIR AREAS A AND B ONLY.

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED AT 6.5" - 7.5" & 18.5" - 19.75", LEFT SIDE

OF PANEL.

 \boxtimes

CRACK LIKE INDICATIONS NOTED AT 6.0" - 7.5" & 17.5" - 19.5", RIGHT SIDE

OF PANEL.

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS AT 4 0" - 5.0", 6.5" - 7.75" & 19.0" - 20.0", LEFT

SIDE OF PANEL.

CRACK LIKE INDICATIONS AT 4.0" - 7.75" & 16.0" - 20.0", RIGHT SIDE OF

PANEL.

Technician Date 6-23-97

LMMSS, MSFC DIVISION

#16RP4

Proj	ect: Misc Tes	st			
Project Descripti	on: 0.200", 9	0.200", 95P95P, VPPA, VERTICAL, R5-5", FL, 70%P, SHAVED			
Test Da	ite: 6/23/97	6/23/97 Specification Used: For Information Only			
Welded Panel	ID: F006	F006 Split Panel: N/A			
Weld A	ea: REPAIR	Planished:		cess: S1	
Area Repair	ed: N/A	Repair Level A: 5	Level B: 5	Level C: 0	
Material Ty	pe: 2195 AL-	-LI N	laterial Thicknes	s: 0.200 "	
Penetrant Type/Meth	od: I/A	Te	est Technician:	D. Newman	
Penetrant System Us	ed: MANUAL	-	Contact:	Johnny Dingler	
Requesting Organiza	tion: MMC/N	MMC/NASA Penetrant: Ardrox P6F		Ardrox P6F4	
Sensitivity Gro	up: III		Developer:	N/A	
Wa	sh: Water				
General Commer	nts: INSPEC	TED REPAIR AREAS	ONLY.		
		DISCREPANCY			
COVER PASS					
Discrepancy:	INFORMAT	ION ONLY			
NO I	NDICATIONS	NOTED AFTER SAN	IDING ONCE.		
ROOT PASS					
Discrepancy:	INFORMAT	ION ONLY			
NO I	NDICATIONS	NOTED AFTER SAN	IDING ONCE.		

LMMSS, MSFC DIVISION

#16RP5

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195, 0.200", 2195P/2195P, VPPA,

VERTICAL, R5-5", FL, 70%P, SHAVED

Welded Panel ID: F007

Split Panel: N/A Test Date: 6/20/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 2

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 77

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A AND B

Frame	View	Status	Discrepancy	_
Α	1	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	

LP = Lack of Penetration

L Por = Linear Porosity

PI = Penetration Line

LF = Lack of Fusion

UC = Undercut

OI = Oxide Inclusion

CC = Crack

UF = Underfill

HI = Heavy Inclusion

CC = Crater Crack

BT = Burn Through

CS = Cold Shut

Por = Porosity

EP = Excessive Penetration

Sh = Shrinkage

Technician

DW Ams

Date 6-20-97

LMMSS, MSFC DIVISION

#16 PF5

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195, 0.200, 2195P/2195P,VPPA.

VERTICAL, R5-5",FL,70%P,SHAVED

Welded Panel ID: F007

Split Panel: N/A

Test Date: 6/20/97

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level C: 0

Level B: 5

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 77

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A AND B

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	NO INDICATIONS NOTED
Α	2	INFO ONLY	AREA OF DARKER DENSITY SHIFT AT 4 1/2"(UNKNOWN CAUSE).
Α	3	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	NO INDICATIONS NOTED
В	2	INFO ONLY	NO INDICATIONS NOTED
В	3	INFO ONLY	NO INDICATIONS NOTED

L Por = Linear Porosity LP = Lack of Penetration PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion UF = Underfill C = Crack HI = Heavy Inclusion BT = Burn Through CC = Crater Crack CS = Cold Shut Por = Porosity EP = Excessive Penetration Sh = Shrinkage

Technician

Date 6-20-97

LMMSS, MSFC DIVISION

#16RP5

		110101		
Project:	Misc Test			
Project Description:	ALTERNATE FILLER WIRE FOR 2195 - 0.200",2195P/2195P, VPPA,VERTICAL, R5-5",FL, 70%P,SHAVED			
Test Date:	6/20/97 Specification Used: For Information Only			
Welded Panel ID:	F007 Split Pa	anel: N/A		
Weld Area:	REPAIR Planished:	Other Process: N/A		
Area Repaired:	N/A Repair Level A: 5	Level B: 5 Level C: 0		
Material Type:	2195 AL-LI Ma	terial Thickness: 0.200 "		
Penetrant Type/Method:	I/A Test	Technician: J. Smith		
Penetrant System Used:	MANUAL	Contact: Gerry Bjorkman		
Requesting Organization	: MMC/NASA	Penetrant: Ardrox P6F4		
Sensitivity Group:	III	Developer: N/A		
Wash:	Water			
General Comments:	REPAIR AREAS A AND B			
	DISCREPANCY			
COVER PASS				
Discrepancy: INI	FORMATION ONLY			
CRACKL	IKE INDICATIONS FULL LENGT	H OF REPAIR AREAS A AND B		
ROOT PASS				
Discrepancy: INI	FORMATION ONLY			

CRACKLIKE INDICATIONS FULL LENGTH OF REPAIR AREAS A AND B

Technician Date 6

LMMSS, MSFC DIVISION

#16 EPS

Project	: Misc Test				
Project Description		ALTERNATE FILLER WIRE FOR 2195 - 0.200", 2195P/2195P, VPPA, VERTICAL, R5-5", FL, 70%P, SHAVED			
Test Date	6/23/97	Specification Us	sed: For Info	rmation Only	
Welded Panel ID	: F007	Split Panel: N/A			
Weld Area	: REPAIR	Planished: 🖂	Other Pro	cess: S1	
Area Repaired	N/A Repai	ir Level A: 5	Level B: 5	Level C: 0	
Material Type	: 2195 AL-LI	Mate	rial Thickne	ss: 0.200 "	
Penetrant Type/Method	: I/A	Test [*]	Technician:	D. Newman	
Penetrant System Used	: MANUAL	MANUAL Contact: Gerry Bj		Gerry Bjorkman	
Requesting Organizatio	n: MMC/NASA	: MMC/NASA Penetrant: Ardro		Ardrox P6F4	
Sensitivity Group	: 111		Developer:	N/A	
Wash	: Water				
General Comments	: INSPECTED RE	EPAIR AREAS ON	LY.		
	DIS	CREPANCY			
COVER PASS					
Discrepancy:	NFORMATION OF	NLY			
NO INC	ICATIONS NOTE	D AFTER SANDIN	IG ONCE.		
ROOT PASS				3	
Discrepancy:	NFORMATION OF	NLY			
NIC X INTE	MONTHONS NOTE	D VETED SVIIDIN	IC ONCE		

Technician David Meumon Date 6-23-97

LMMSS, MSFC DIVISION

#16RPG

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F019

Split Panel: N/A Test Date: 9/24/98

Weld Area: INITIAL

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 0

Level B: 0

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-16

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Density: 2.0 - 40

Film Size: 4 5" X 17"

MA: 10

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED FROM 15"-23.5".

Frame	View	Status	Discrepancy
1.5"- 23.5"	1	INFO ONLY	NO INDICATIONS NOTED

L Por = Linear Porosity LP = Lack of Penetration PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion UF = Underfill HI = Heavy Inclusion C = Crack BT = Burn Through CC = Crater Crack CS = Cold Shut EP = Excessive Penetration Por = Porosity Sh = Shrinkage

Rich - Chelle Technician

Date 9-25-98

LMMSS, MSFC DIVISION

#16 RP6

Project:	Misc Test		
Project Description:	0.200", 2195P/ 2195 3", 70%P, SHAVED.	P, STANDARD PANEL, VF	PA, VERTICAL, FL-R5-
Test Date:	9/24/98 Sp	ecification Used: For Info	ormation Only
Welded Panel ID:	F019 Split Panel: N/A		
Weld Area:	INITIAL P	INITIAL Planished: Other Process: N/A	
Area Repaired:	N/A Repair Le	evel A: 0 Level B: 0	Level C: 0
Material Type:	2195 AL-LI	Material Thickne	ss: 0.200 "
Penetrant Type/Method:	I/A	Test Technician:	K. Wılliams
Penetrant System Used:	MANUAL Contact: Billy Melson		Billy Melson
Requesting Organization	: MMC/NASA Penetrant: Ard		Ardrox P135E
Sensitivity Group:	111	Developer:	N/A
Wash:	Water		
General Comments:	WELD INSPECTED	D FROM 1 5"- 23.5".	
	DISCRI	EPANCY	
COVER PASS			
Discrepancy: 🔲 IN	FORMATION ONLY		
NO DIS	CREPANCIES NOT	ED.	
ROOT PASS			
Discrepancy: 🔲 IN	FORMATION ONLY		
NO DIS	CREPANCIES NOTI	ED.	

Technician William Date 9-24-95

LMMSS, MSFC DIVISION

#16RP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F019

Split Panel: N/A Test Date: 9/28/98

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5 Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-16

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K. Williams

MA: 10

Film Type: KODAK M Film Size: 8" X 10"

Density: 2.0 - 40

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy
A	1	INFO ONLY	POROSITY NOTED, WITHIN SPECS.
В	1	INFO ONLY	CLUSTER POROSITY NOTED AT 20.5", IN EXCESS OF SPECS.

 LP = Lack of Penetration
 L Por = Linear Porosity
 PI = Penetration Line

 LF = Lack of Fusion
 UC = Undercut
 OI = Oxide Inclusion

 C = Crack
 UF = Underfill
 HI = Heavy Inclusion

 CC = Crater Crack
 BT = Burn Through
 CS = Cold Shut

 Por = Porosity
 EP = Excessive Penetration
 Sh = Shrinkage

Technician

Ruch Will -

Date

9-28-98

LMMSS, MSFC DIVISION

#16RP6

Program Name: Misc Test

Program Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F019

Split Panel: N/A

Test Date: 9/29/98

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-16

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K Williams

Film No: 6

X-Ray Interpreted By: K Williams

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 8" X 10"

MA: 10

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy	
A		INFO ONLY	LINEAR INDICATION NOTED AT 7.0", 0.095" IN LENGTH LINEAR INDICATION NOTED AT 7.5", 0.280" IN LENGTH LINEAR INDICATION NOTED AT 8.0", 0.120" IN LENGTH.	
Α	2	INFO ONLY	NO INDICATIONS NOTED.	
Α	3	INFO ONLY	SAME AS VIEW 1	
В	1	INFO ONLY	CLUSTER POROSITY NOTED AT 20.5", IN EXCESS OF SPECS	
В	2	INFO ONLY	SAME AS VIEW 1	
В	3	INFO ONLY	SAME AS VIEW 1	

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Date 9-25-84

LMMSS, MSFC DIVISION

#16RP6

Project: Misc Test

Project Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Test Date: 9/30/98

Specification Used: For Information Only

Welded Panel ID: F019

Split Panel: N/A

Weld Area: REPAIR

Planished: 🖂

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Penetrant Type/Method: I/A

Test Technician: K. Williams

Penetrant System Used: MANUAL

Contact: Billy Melson

Requesting Organization: MMC/NASA

Penetrant: Ardrox P135E

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 3.5"- 5.25", 5.75"- 8.0", & 16.0"- 20.0", P-122 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 3.25"- 6.0", 6.5"-

8.5", 15.0"- 16.5", & 18.0"- 20.75", P-123 SIDE.

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM

3 0"- 4 5", 5 5"- 8 0", & 17.5"- 20.5", P-122 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 30"-90" &

15.0"- 20.5", P-123 SIDE.

Technician Rich William Date 9-30-93

LMMSS, MSFC DIVISION

#16RP6

Project:	Misc Test		
Project Description:	0 200", 2195P/ 2195P, STAN 3", 70%P, SHAVED.	IDARD PANEL, VPPA	A, VERTICAL, FL-R5-
Test Date:	10/1/98 Specificati	on Used: For Inform	nation Only
Welded Panel ID:	F019 Sp	lit Panel: N/A	
Weld Area:	REPAIR Planished	Planished: 🛛 Other Process: S1	
Area Repaired:	N/A Repair Level A: 5	Level B: 5	Level C: 0
Material Type:	2195 AL-LI	Material Thickness	: 0.200 "
Penetrant Type/Method:	I/A	Test Technician: K	. Wılliams
Penetrant System Used:	MANUAL	Contact: B	illy Melson
Requesting Organization	: MMC/NASA	Penetrant: A	rdrox P135E
Sensitivity Group:	III	Developer: N	/A
Wash:	Water		
General Comments:	WELD INSPECTED IN RE	PAIR AREAS ONLY	′ .
	DISCREPANC	Υ	
COVER PASS			
Discrepancy: IN	FORMATION ONLY		
NO DIS	CREPANCIES NOTED AFT	ER SANDING ONC	E
ROOT PASS			
Discrepancy: IN	FORMATION ONLY		
NO DIS	CREPANCIES NOTED AFT	ER SANDING ONC	E.

Technician	Kuch	11 Jellan	Date	10-1-42
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LMMSS, MSFC DIVISION

#16RP7

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F020

Split Panel: N/A

Test Date: 9/24/98

Weld Area: INITIAL

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 0

Level B: 0

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-16

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K Williams

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4 5" X 17"

MA: 10

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED FROM 0.0"- 23.5".

Frame	View	Status	Discrepancy
0.0"- 23.5	1	INFO ONLY	NO INDICATIONS NOTED.

L Por = Linear Porosity LP = Lack of Penetration PI = Penetration Line UC = Undercut OI = Oxide Inclusion LF = Lack of Fusion UF = Underfill = Crack HI = Heavy Inclusion BT = Burn Through CC = Crater Crack CS = Cold Shut EP = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician

Hick William - Date 9-24-87

LMMSS, MSFC DIVISION

#16RF7

Project:	Misc Test	
Project Description:	0 200", 2195P/ 2195P, STAN 3", 70%P, SHAVED.	IDARD PANEL, VPPA, VERTICAL, FL-R5-
Test Date:	9/24/98 Specificati	ion Used: For Information Only
Welded Panel ID:	F020 Sp	lit Panel: N/A
Weld Area:	INITIAL Planished	d: Other Process: N/A
Area Repaired:	N/A Repair Level A: 0	Level B: 0 Level C: 0
Material Type:	2195 AL-LI	Material Thickness: 0.200 "
Penetrant Type/Method:	1/A	Test Technician: K Williams
Penetrant System Used:	MANUAL	Contact: Billy Melson
Requesting Organizatior	ı: MMC/NASA	Penetrant: Ardrox P135E
Sensitivity Group:	111	Developer: N/A
Wash:	Water	
General Comments:	WELD INSPECTED FROM	1 0.0"- 23.5".
	DISCREPANC	Υ
COVER PASS		
Discrepancy: IN	FORMATION ONLY	
NO DIS	CREPANCIES NOTED	
ROOT PASS		
	FORMATION ONLY	
NO DIS	CREPANCIES NOTED	

Technician Killseller Date 9-24-98

LMMSS, MSFC DIVISION

#16RP7

Program Name: Misc Test

Program Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

KV: 86

Welded Panel ID: F020

Split Panel: N/A Test Date: 9/29/98

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5 Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-16

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K Williams

Film Type: KODAK M Film Size: 8" X 10"

Density: 2.0 - 40

FFD: 49 in.

Time: 30 sec.

MA: 10

Comments: WELD INSPECTED IN REPAIR AREAS ONLY

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	POROSITY NOTED, WITHIN SPECS.
В	1	INFO ONLY	NO INDICATIONS NOTED.

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfilt	HI = Heavy Inclusion
CC = Crater Crack	BT ≃ Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician Kuth William

Date 9-29-92

LMMSS, MSFC DIVISION

#16RP7

Program Name: Misc Test

Program Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F020

Split Panel: N/A

Test Date: 10/1/98

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-16

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 6

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Density: 2.0 - 40

Film Size: 8" X 10"

MA: 10

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	NO INDICATIONS NOTED
Α	2	INFO ONLY	NO INDICATIONS NOTED.
Α	3	INFO ONLY	NO INDICATIONS NOTED.
В	1	INFO ONLY	NO INDICATIONS NOTED
В	2	INFO ONLY	NO INDICATIONS NOTED
В	3	INFO ONLY	NO INDICATIONS NOTED

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Date 10-1-98

LMMSS, MSFC DIVISION

#16 RP7

Project: Misc Test

Project Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Test Date: 10/1/98

Specification Used: For Information Only

Welded Panel ID: F020

Split Panel: N/A

Weld Area: REPAIR

Planished: 🖂

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: !/A

Test Technician: K Williams

Penetrant System Used: MANUAL

Contact: Billy Melson

Requesting Organization: MMC/NASA

Penetrant: Ardrox P135E

Sensitivity Group: III

Developer: N/A

Wash: Water

 \boxtimes

General Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 3.0"- 8.0" & 15.0"- 20.5", P-240 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 2.75"- 8 25" & 14.75"- 20.5", P-

116 SIDE.

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 3.0"- 8 25", 15.0"- 16.0", & 18.5"- 20.0", P-240 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 2.25"- 3.0",

5 25"- 9.0", & 15.0"- 20.75", P-116 SIDE

Technician Kirch William - Date 10-1-98

LMMSS, MSFC DIVISION

#16RF7

				1019
Project:	Misc Test			
Project Description:	0 200", 2195P/ 2 3", 70%P, SHAV		PANEL, VPPA,	VERTICAL, FL-R5-
Test Date:	10/1/98	Specification Us	ed: For Informa	ntion Only
Welded Panel ID:	F020	Split Pan	iel: N/A	
Weld Area:	REPAIR	Planished: 🗵	Other Proces	ss: S2
Area Repaired:	N/A Repair	r Level A: 5	Level B: 5	Level C: 0
Material Type:	2195 AL-LI	Mate	rial Thickness:	0.200 "
Penetrant Type/Method:	I/A	Test 1	Technician: K. V	Williams
Penetrant System Used:	MANUAL		Contact: Bill	y Melson
Requesting Organizatior	: MMC/NASA		Penetrant: Ard	irox P135E
Sensitivity Group:	Ш		Developer: N/A	
Wash:	Water			
General Comments: WELD INS		TED IN REPAIR	AREAS ONLY	
	DISC	CREPANCY		
COVER PASS				
Discrepancy: IN	FORMATION ON	LY		
NO DIS	CREPANCIES N	OTED AFTER SA	ANDING ONCE	
ROOT PASS				
Discrepancy: IN	FORMATION ON	LY		

NO DISCREPANCIES NOTED AFTER SANDING TWICE.

Technician Kinh William Date 10-1-98

LMMSS, MSFC DIVISION

#17801

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200",2195P/2195P, VPPA,

VERTICAL, R5-5", 70%P, SHAVED

Welded Panel ID: F013

Split Panel: N/A

Test Date: 6/26/97

Weld Area: REPAIR

Planished: Other Process: N/A

Level C: 0

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 2

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 79

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREAS A & B

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	CRACK 0.225" AT 6 3/4" LOCATION.
В	1	INFO ONLY	NO INDICATIONS NOTED

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line LF = Lack of Fusion UC = Undercut OI = Oxide Inclusion C = Crack UF = Underfill HI = Heavy Inclusion = Burn Through CC = Crater Crack BT CS = Cold Shut Por = Porosity = Excessive Penetration EP Sh = Shrinkage

Technician

Date 6-20-27

LMMSS, MSFC DIVISION

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195- 0.200",2195P/2195P, VPPA,

VERTICAL, R5-5", SHAVED

Welded Panel ID: F013

Split Panel: N/A Test Date: 6/27/97

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 6

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4 5" X 17"

MA: 10

KV: 80

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR ARE A & B

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	ISOLATED POROSITY NOT IN EXCESS 0F STP5508
Α	2	INFO ONLY	NO INDICATIONS NOTED
Α	3	INFO ONLY	NO INDICATION NOTED
В	1	INFO ONLY	NO INDICATIONS NOTED
В	2	INFO ONLY	NO INDICATIONS NOTED
В	3	INFO ONLY	NO INDICATIONS NOTED

LP = Lack of Penetration LF = Lack of Fusion

UC = Undercut

PI = Penetration Line

C = Crack

UF = Underfill OI = Oxide Inclusion HI = Heavy Inclusion

CC = Crater Crack Por = Porosity

BT = Burn Through EΡ Excessive Penetration

L Por = Linear Porosity

CS = Cold Shut Sh = Shrinkage

Technician

Date 6-27-17

LMMSS, MSFC DIVISION

#17R01

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200",2195P/2195P. VPPA.

VERTICAL, R5-5", SHAVED

Test Date: 6/27/97

Specification Used: For Information Only

Welded Panel ID: F013

Split Panel: N/A

Weld Area: REPAIR

Planished:

Other Process: N/A

Area Repaired: N/A

Repair Level A: 6

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Test Technician: J Smith

Penetrant Type/Method: I/A

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: |||

Developer: N/A

Wash: Water

General Comments: REPAIR AREA A & B

DISCREPANCY

COVER PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

REPAIR A (RT)- CRACKLIKE INDICATION FROM 4" - 8". (LT)- 4 3/4" - 5 1/2". REPAIR B-(RT)- CRACKLIKE INDICATION FROM 17 - 19 3/4" (LT) 16 3/4" - 20".

ROOT PASS

Discrepancy:

INFORMATION ONLY

REPAIR A (RT)- CRACKLIKE INDICATION FROM 4 1/4" - 7 1/2".(LT)- 4 1/2" - 7 1/2". REPAIR B(RT)- CRACKLIKE INDICATION FROM 16 1/4" - 17 1/2" AND

FROM 18 1/4" - 20" (LT)- 16" - 18" AND FROM 18 1/2" - 19 1/4".

Technician Date 6-27-97

LMMSS, MSFC DIVISION

#17RO1

Project:	Misc Test		
Project Description:	ALTERNATE FILLER WIRE 2195P/2195P,VPPA,VERTI		ED .
Test Date:	7/1/97 Specificat	ion Used: For Inform	ation Only
Welded Panel ID:	F013 Sp	lit Panel: N/A	
Weld Area:	REPAIR Planishe	d: 🔲 Other Proce	ess: S2
Area Repaired:	N/A Repair Level A: 6	Level B: 5	Level C: 0
Material Type:	2195 AL-LI	Material Thickness:	: 0.200 "
Penetrant Type/Method:	I/A	Test Technician: J.	Smith
Penetrant System Used:	MANUAL	Contact: Jo	hnny Dingler
Requesting Organization	: MMC/NASA	Penetrant: Ar	drox P6F4
Sensitivity Group:	III	Developer: N/	A
Wash:	Water		
General Comments:	SANDED AREAS ONLY		
	DISCREPANO	Y	
COVER PASS			
Discrepancy: IN	FORMATION ONLY		
NO INDI	CATIONS AFTER SECOND	SAND	
ROOT PASS			
Discrepancy: INI	FORMATION ONLY		
NO INDI	CATIONS AFTER SECOND	SAND	

Date 7-1-97

LMMSS, MSFC DIVISION

17R02

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195-

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,SHAVED

Welded Panel ID: F014

Split Panel: N/A

Test Date: 6/27/97

Weld Area: REPAIR

Planished: Other Process: COMP

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 80

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A &B

Frame	View	Status	Discrepancy
A	1	INFO ONLY	ISOLATED OXIDES/POROSITY NOT IN EXCESS OF STP5508
Α	2	INFO ONLY	SAME AS VIEW 1
Α	3	INFO ONLY	SAME AS VIEW 1
В	1	INFO ONLY	NO INDICATIONS NOTED
В	2	INFO ONLY	NO INDICATIONS NOTED
В	3	INFO ONLY	NO INDICATIONS NOTED

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion C = Crack UF = Underfill HI = Heavy Inclusion BT = Burn Through CS = Cold Shut CC = Crater Crack Por = Porosity EP = Excessive Penetration Sh = Shrinkage

Technician

Date (1-22-9)

LMMSS, MSFC DIVISION

#17R0Z

Project: Misc Test

Project Description: 0.200",2195P/21295P, VPPA, VERTICAL, R5-5", FL, SHAVED

Test Date: 6/27/97

Specification Used: For Information Only

Welded Panel ID: FO14

Split Panel: N/A

Weld Area: REPAIR

Planished:

Repair Level A: 5

Other Process: N/A

Area Repaired: N/A

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

 \boxtimes

 \boxtimes

Developer: N/A

Wash: Water

General Comments: REPAIR AREA A & B

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

REPAIR A(RT) CRACKLIKE INDICATION FROM 4 1/2" - 8 1/4".(LT) 4 3/4" - 8 1/4". REPAIR B (RT)- CRACKLIKE INDICATION FROM 16 1/2" - 19 3/4". (LT)-

17" - 19 3/4".

ROOT PASS

Discrepancy:

INFORMATION ONLY

REPAIR A (RT) - CRACKLIKE INDICATIONS FROM 4 1/2" - 5 3/4", AND FROM 6 1/4" - 8". (LT) - 4 1/4" - 5 1/2" AND FROM 7 1/2 - 8 1/2". REPAIR AREA B (RT) - CRACKLIKE INDIDICATIONS FROM 16" - 17" AND FROM 18 1/4" - 20".

(LT) - 16" - 17 1/4" AND FROM 19 1/4" - 20 1/4".

Technician

Date 6-27-97

LMMSS, MSFC DIVISION

#17ROZ

Pro	oject:	Misc Tes	ł	-					
Project Descrip	tion:			LER WIRE 95P,VPPA,			L,Sŀ	HAVED	
Test I	Date:	6/30/97		Specificat	ion Use	d: For Info	orma	tion Only	
Welded Pane	el ID:	F014		Sp	lit Pane	el: N/A			
Weld A	Area:	REPAIR		Planished	d: 🔲	Other Pro	oces	s: S2	
Area Repa	ired:	N/A	Repair	Level A: 5	L	evel B: 5		Level C: 0	
Material 7	уре:	2195 AL-	_1		Materi	al Thickne	ss:	0.200 "	
Penetrant Type/Met	hod:	I/A			Test Te	chnician:	J. S	mith	
Penetrant System U	lsed:	MANUAL				Contact:	Joh	nny Dingler	
Requesting Organiz	ation	: MMC/NA	NSA		F	Penetrant:	Ard	rox P6F4	
Sensitivity Gr	oup:	111			D	eveloper:	N/A		
W	lash:	Water							
General Commo	ents:	SANDED	AREAS	ONLY					
			DISC	REPANC	Υ		***		
COVER PASS									
Discrepancy:	INF	FORMATI	ON ON	LY					
NC	INDI	CATIONS	AFTER	SECOND	SAND				· · · · · · · · · · · · · · · · · · ·
ROOT PASS		7,11-36							
Discrepancy:	IN	FORMATI	ON ON	LY					
NC	INDI	CATIONS	AFTER	SECOND	SAND				

Technician Date 7-1-97

LMMSS, MSFC DIVISION

#17R03

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 -

0.200",2195P/2195P,VPPA,VERTICAL,R5-5",FL,SHAVED

Welded Panel ID: F015

Split Panel: N/A Test Date: 6/30/97

Weld Area: REPAIR Area Repaired: N/A

Planished: Other Process: N/A

Repair Level A: 5 Level B: 5 Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J Smith

Film No: 6

X-Ray Interpreted By: J Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 78

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A & B

Frame	View	Status	Discrepancy
A	1	INFO ONLY	ISOLATED OXIDES NOT IN EXCESS OF STP5508
Α	2	INFO ONLY	NO INDICATIONS NOTED
Α	3	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	ISOLATED HI NOT IN EXCESS OF STP5508
В	2	INFO ONLY	NO INDICATIONS NOTED
В	3	INFO ONLY	SAME AS VIEW 1

PI = Penetration Line LP = Lack of Penetration L Por = Linear Porosity UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion C = Crack UF = Underfill HI = Heavy Inclusion = Burn Through CC = Crater Crack BT CS = Cold Shut = Excessive Penetration ΕP Por = Porosity Sh = Shrinkage

Technician

Date

6-30-97

LMMSS, MSFC DIVISION

#17R03

Project: Misc Test

Project Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200", 2195P/2195P, VPPA,

VERTICAL, R5-5",FL, SHAVED

Test Date: 6/30/97

Specification Used: For Information Only

Welded Panel ID: F015

Split Panel: N/A

Weld Area: REPAIR

Planished:

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Penetrant Type/Method: I/A

Test Technician: J. Smith

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P6F4

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: REPAIR A & B

DISCREPANCY

COVER PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

REPAIR AREA A (RT)- CRACKLIKE INDICATION FROM 6 3/4" - 8". (LT)- 6" -8". REPAIR AREA B(RT)- CRACKLIKE INDICATION FROM 16 3/4" - 19 3/4".

(LT)- 17" - 20".

ROOT PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

REPAIR A (RT)- CRACKLIKE INDICATION FROM 7" - 8" (LT)- 7 1/4" - 8 1/4".

Technician

Date 6-36-97

LMMSS, MSFC DIVISION

#17R03___

Project:	Misc Test				
Project Description:	ALTERNATE WI VERTICAL, R5-5		200", 2195P/	2195P, VPPA,	
Test Date:	7/1/97	Specification Us	ed: For Info	rmation Only	
Welded Panel ID:	F015	Split Pan	el: N/A		
Weld Area:	REPAIR	Planished: 🔲	Other Pro	cess: S1	
Area Repaired:	N/A Repair	Level A: 5	Level B: 5	Level C: 0	
Material Type:	2195 AL-LI	Mater	rial Thicknes	ss: 0.200 "	
Penetrant Type/Method:	I/A	Test T	echnician:	J. Smith	
Penetrant System Used:	MANUAL		Contact:	Johnny Dingler	
Requesting Organization	: MMC/NASA		Penetrant:	Ardrox P6F4	
Sensitivity Group:	111	I	Developer:	N/A	
Wash:	Water				
General Comments:	SANDED AREAS	ONLY			
	DISC	REPANCY			
COVER PASS					
Discrepancy: 🔲 INI	FORMATION ON	LY			
NO INDI	CATIONS AFTER	ONE SAND			
ROOT PASS					
	FORMATION ON	LY			
NO INDI	CATIONS AFTER	ONE SAND			

Technician Date 7-1-97

LMMSS, MSFC DIVISION

#17R04

Program Name: Misc Test

Program Description: ALTERNATE FILLER WIRE FOR 2195 - 0.200", 2195P/2195P/VPPA,

VERTICAL, R5-5", SHAVED

Welded Panel ID: F016

Split Panel: N/A

Test Date: 6/30/97

Weld Area: REPAIR

Planished: Other Process: N/A

. . . .

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: N/A

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: J. Smith

Film No: 6

X-Ray Interpreted By: J. Smith

Film Type: KODAK M

Density: 2.0 - 4.0

Г

Film Size: 4.5" X 17"

MA: 10

KV: 79

FFD: 42 in.

Time: 30 sec.

Comments: REPAIR AREA A & B

Frame	View	Status	Discrepancy	
Α	1	INFO ONLY	NO INDICATIONS NOTED	
Α	2	INFO ONLY	NO INDICATIONS NOTED	
Α	3	INFO ONLY	NO INDICATIONS NOTED	
В	1	INFO ONLY	NO INDICATIONS NOTED	
В	2	INFO ONLY	NO INDICATIONS NOTED	
В	3	INFO ONLY	NO INDICATIONS NOTED	

LP = Lack of Penetration

LP = Linear Porosity

PI = Penetration Line

LF = Lack of Fusion

UC = Undercut

OI = Oxide Inclusion

C = Crack

UF = Underfill

HI = Heavy Inclusion

CC = Crater Crack

BT = Burn Through

CS = Cold Shut

Por = Porosity

EP = Excessive Penetration

Sh = Shrinkage

Technician

Date 4-30-97

LMMSS, MSFC DIVISION

#17R04

	LIVINGO,			"17KU4	_
Project:	Misc Test				_
Project Description:	ALTERNATE FII VERTICAL,R5-5		2195 - 0.200",2	2195P/2195P,VPPA,	
Test Date:	6/30/97	Specification Us	ed: For Inform	mation Only	
Welded Panel ID:	F016	Split Par	nel: N/A		
Weld Area:	REPAIR	Planished: 🔲	Other Proc	ess: N/A	
Area Repaired:	N/A Repair	Level A: 5	Level B: 5	Level C: 0	
Material Type:	2195 AL-LI	Mate	rial Thickness	s: 0.200 "	
Penetrant Type/Method:	I/A	Test 1	Technician: J	. Smith	
enetrant System Used:	MANUAL		Contact: J	ohnny Dingler	
Requesting Organization	: MMC/NASA		Penetrant: A	Ardrox P6F4	
Sensitivity Group:	111		Developer: N	I/A	
Wash:	Water				
General Comments:	REPAIR A &B				
	DISC	REPANCY			_
COVER PASS Discrepancy: INI	FORMATION ON	LY			
AREA A	(LŤ)- ĆRACKLIKI		ROM 4 1/2" - 7	- 18 1/2". REPAIR 3/4". REPAIR B (LT)-	
ROOT PASS					_

Technician

Discrepancy:

INFORMATION ONLY

NO INDICATIONS NOTED

___ Date

6-30-9

LMMSS, MSFC DIVISION

#17R04

		, , , , , , , , , , , , , , , , , , ,
Project:	Misc Test	
Project Description:	ALTERNATE FILLER WIRE FOR 2195 - 0.2 VERTICAL, R5-5", SHAVED	00",2195P/2195P, VPPA,
Test Date:	7/1/97 Specification Used: For I	nformation Only
Welded Panel ID:	F016 Split Panel: N/A	
Weld Area:	REPAIR Planished: Other	Process: S1
Area Repaired:	N/A Repair Level A: 5 Level B:	5 Level C: 0
Material Type:	2195 AL-LI Material Thick	ness: 0.200 "
Penetrant Type/Method:	I/A Test Technicia	n: J Smith
Penetrant System Used:	MANUAL Contac	t: Johnny Dingler
Requesting Organization	: MMC/NASA Penetran	t: Ardrox P6F4
Sensitivity Group:	III Develope	r: N/A
Wash:	Water	
General Comments:	SANDED AREAS ONLY	
	DISCREPANCY	
COVER PASS		
Discrepancy: IN	FORMATION ONLY	
NO INDI	CATIONS AFTER ONE SAND	
ROOT PASS		
Discrepancy: IN	FORMATION ONLY	
N/A		

Technician Justinia

Date 7-1-97

NONDESTRUCTIVE EVALUATION BRANCH

RADIOGRAPHIC INSPECTION REPORT

Program Name:

EH23 Weld Panel Traceability

Program Description: F/Wire

ID: 17RP1

Report Date: 12-18-96

Material Type: AL 2195-T8

Material Thickness: .200"

X-ray unit: Philips 320KV

Acceptance Specification: None

Film no.: 6

Radiographer: Dexter Strong

Film type: Kodak M

Interpreted by: Dexter Strong/Linda Clark

Film size: 4.5" x 17"

MA: 10 KV: 74 FFD: 48" Time: 0.6 min.

<u>Frame</u>	<u>View</u>	<u>Status</u>	Discrepancy
A	1		No indications noted
В	1		No indications noted
A	2		No indications noted
В	2		No indications noted
A	3		scratch on film in center of weld
			(non-relevant)
В	3		No indications noted

NONDESTRUCTIVE EVALUATION BRANCH

SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

Program Name MISC. TEST

Program Description: ALTERNATE WIRE TEST

Tets Date: 05/06/97 Specification Used: Information Only

Weld Area: Repair Planished: Other Process:

Welded Panel ID: 17 RP1 Repair Area A: 5

Material Type 2195 AL-LI Repair Area B: 5

Requesting Organization: LMC/NASA Repair Area C

Penetrant Type/Method: I/A Test Technician: J. Smith

Penetrant System Used Manual

Material Thickness 0.200" Contact J. DINGLER
Sensitivity Group: III Penetrant: Ardrox P6F4

Wash: Water Developer. N/A

Comments. REPAIR AREAS A AND B

DISCREPANCY

COVER PASS

Discrepancy Information Only
NUMEROUS CRACKLIKE INDICATIONS ON REPAIR AREAS

A AND B.

ROOT PASS

NUMEROUS CRACKLIKE INDICATIONS ON REPAIR AREAS

A AND B.

Technician Who

Date 5-6-97

LMMSS, MSFC DIVISION

Program Name	MISC. TEST		
Program Description:	ALTERNATE WIRE TEST		
Tets Date:	05/07/97	Specification Used	Information Only
Weld Area:	Repair Planished: 🖂	Other Process:	SAND AND
•	• –		ETCH ONCE
Welded Panel ID:	17 RP1	Repair Area A:	5
Material Type:	2195 AL-LI	Repair Area B:	5
• •		-	
Requesting Organizaation:	LMC/NASA	Repair Area C:	
Penetrant Type/Method:	I/A	Test Technician:	J. Smith
Penetrant System Used:	Manual		
Material Thickness.	0 200''	Contact:	J. DINGLER
Sensitivity Group:	Ш	Penetrant:	Ardrox P6F4
Wash. Water		Developer	N/A
Comments: SANDED AF	REAS ONLY		
	DISCREPANCY		
COVED DASS	DISCREPANCY		
COVER PASS			
COVER PASS Discrepancy:	Information Only	AETER ONE SANI	.
·		O AFTER ONE SANI)
·	Information Only	O AFTER ONE SANI)
·	Information Only	O AFTER ONE SANI)
·	Information Only	O AFTER ONE SANI)
·	Information Only	O AFTER ONE SANI)
·	Information Only	O AFTER ONE SANI)
·	Information Only	O AFTER ONE SANI)
Discrepancy:	Information Only	O AFTER ONE SANI)

Technician Winny

Date <u>5-7-97</u>

SLWT RADIOGRAPHIC INSPECTION REPORT

LMMSS, MSFC DIVISION

Program Name FILLER WIRE REPAIR PROGRAM

Program Description

Test Date: 01/15/97 Planished: Other Process:

Welded Panel ID: 17-RP2 Weld Area Initial
Material Type: 2195 AL-LI Repair Area A: R5
Material Thickness: 0.200" Repair Area B: R5

Wire Type: N/A Repair Area C:

Acceptance Specification: For Information Only X-Ray Unit: Philips X-Rayed By: D Newman Film Number: 2

X-Ray Interpreted By: D. Newman Film Type Kodak M

Density 2.0 - 4.0 Film Size: 4.5" X 17"

MA: 10 KV: 80 FFD: 42" Time: 30

Comments: REPAIR AREAS A AND B ONLY

Frame:	View	Status	Discrepancy
A	1	Info Only	NO INDICATIONS NOTED.
В	1	Info Only	SMALL AMOUNT OF SCATTERED OXIDES.
		Info Only	
		Info Only	
		Info Only	
		Info Only	

LP = Lack of Penetration LF = Lack of Fusion C = Crack CC = Crater Crack	L Por = Linear Porosity UC = Undercut UF = Underfill BT = Burn Through	PI = Penetration Line OI = Oxide Inclusion HI = Heavy Inclusion CS = Cold Shut
CC = Crater Crack Por = Porisity	BT = Burn Through EP = Excessive Penetration	CS = Cold Shut SH = Shrinkage

Technician Down Meumon

Date <u>01-15.97</u>

LMMSS, MSFC DIVISION

#17RP3

FIWIRE Program Name:

SLWT Program Description:

2195-78 I W Split Panel: Welded Panel ID:

Test Date:

Weld Area:

Planished: Other Process:

Area Repaired:

Repair Level A:

Level B:

Level C:

Material Type: 2/95-78

Material Thickness: , 200

Wire Type: Chem 17

Acceptance Specification: 504 C

X-Ray Unit: 8/dg 47/11

X-Rayed By: W. STRUY]

Film No:

Film Type: ~

X-Ray Interpreted By:

Density: (2,0-4.0

Film Size: 4/2 X17

MA:15

KV: 76

FFD:

in. 52 Time:

sec. 36

Comments:

Frame View Status Discrepancy CK and POR. AT 2"/A NON relevent

LP = Lack of Penetration LF = Lack of Fusion

C = Crack CC = Crater Crack Por = Porosity

L Por = Linear Porosity

PI = Penetration Line

UC = Undercut UF = Underfill = Burn Through

= Excessive Penetration

Of = Oxide Inclusion HI = Heavy Inclusion

CS = Cold Shut Sh = Shrinkage

Technician

Date 10/25

LMMSS, MSFC DIVISION

Program Name: F/WIRE

Program Description: 5Lw7

17-RP4 IN Welded Panel ID: Split Panel:

Planished: Other Process: Weld Area:

Area Repaired: Repair Level A: Level B: Level C:

Material Type: 2195-78

Wire Type: Chem 17 Material Thickness: , 200

X-Ray Unit: 84, 4711 Acceptance Specification: 5040 Film No:

X-Rayed By: ひっちほのいり

X-Ray Interpreted By: Film Type: 🖰

Density: 2.0 - 4.0 Film Size: 41/2×17 KV: 70 in. 57_ Time: sec. 30 MA: 15 FFD:

Comments:

Frame View Status Discrepancy NONE DK IW

LP = Lack of Penetration

LF = Lack of Fusion

C = Crack CC = Crater Crack

Por = Porosity

L Por = Linear Porosity

UC = Undercut UF = Underfill

= Burn Through вт

= Excessive Penetration

PI = Penetration Line

OI = Oxide inclusion

HI = Heavy Inclusion

CS = Cold Shut

Sh = Shrinkage

Date

LMMSS, MSFC DIVISION

Program Name FILLER WIRE REPAIR PROGRAM

Program Description:

Test Date: 01/15/97 Planished: Other Process:

Welded Panel ID: 17-RP4 Weld Area Initial
Material Type: 2195 AL-LI Repair Area A: R5
Material Thickness: 0.200" Repair Area B: R5

Wire Type: N/A Repair Area C:

Acceptance Specification: For Information Only X-Ray Unit: Philips X-Rayed By: D. Newman Film Number: 2

X-Ray Interpreted By: D. Newman Film Type Kodak M
Density: 2.0 - 4.0 Film Size: 4.5" X 17"

MA: 10 KV: 80 FFD: 42" Time: 30

Comments: REPAIR AREAS A AND B ONLY

Frame:	View	Status	Discrepancy
A	1	Info Only	SMALL AMOUNT OF SCATTERED OXIDES/POROSITY.
В	1	Info Only	SMALL AMOUNT OF SCATTERED OXIDES/POROSITY.
		Info Only	
		Info Only	
		Info Only	
		Info Only	

LP = Lack of Penetration LF = Lack of Fusion C = Crack CC = Crater Crack Por = Porisity	L Por = Linear Porosity UC = Undercut UF = Underfill BT = Burn Through EP = Excessive Penetration	PI = Penetration Line OI = Oxide Inclusion HI = Heavy Inclusion CS = Cold Shut SH = Shrinkage	
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Technician Dair Menmon

Date 01-15-97

SLWT RADIOGRAPHIC INSPECTION REPORT

LMMSS, MSFC DIVISION

Program Name FILLER WIRE REPAIR PROGRAM

Program Description:

Test Date: 01/15/97 Planished: Other Process:

Welded Panel ID: 17-RP5 Weld Area Initial
Material Type: 2195 AL-LI Repair Area A: R5
Material Thickness: 0.200" Repair Area B R5

Wire Type: N/A Repair Area C:

Acceptance Specification: For Information Only X-Ray Unit: Philips

X-Rayed By: D. Newman Film Number: 2

X-Ray Interpreted By: D. Newman Film Type Kodak M
Density: 2.0 - 4.0 Film Size: 4.5" X 17"

MA: 10 KV: 80 FFD: 42" Time: 30

Comments: REPAIR AREAS A AND B ONLY

Frame:	View	Status	Discrepancy
A	1	Info Only	SMALL AMOUNT OF SCATTERED POROSITY.
В	1	Info Only	SMALL AMOUNT OF SCATTERED POROSITY.
		Info Only	
		Info Only	
		Info Only	
		Info Only	

LP = Lack of Penetration LF = Lack of Fusion	L Por = Linear Porosity UC = Undercut	PI = Penetration Line OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack Por = Porisity	BT = Burn Through EP = Excessive Penetration	CS = Cold Shut SH = Shrinkage

Technician David Meuman

Date 01-15-97

LMMSS, MSFC DIVISION

#17RP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F021

Split Panel: N/A

Test Date: 9/25/98

Weld Area: INITIAL

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 0

Level B: 0

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-17

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Density: 2.0 - 40

Film Size: 4.5" X 17"

MA: 10

KV: 86

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED FROM 0.0"- 23.5"

Frame	View	Status	Discrepancy
0.0"- 23.5"	1	INFO ONLY	NO INDICATIONS NOTED.

L Por = Linear Porosity LP = Lack of Penetration PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion UF = Underfill HI = Heavy Inclusion C = Crack CC = Crater Crack BT = Burn Through CS = Cold Shut EP = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician

Date 9-25-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS. MSFC DIVISION

#17886

		"11/10
Project:	Misc Test	
Project Description:	0.200", 2195P/ 2195P, STANDARD PA 3", 70%P, SHAVED.	ANEL, VPPA, VERTICAL, FL-R5-
Test Date:	9/25/98 Specification Used:	For Information Only
Welded Panel ID:	F021 Split Panel:	N/A
Weld Area:	INITIAL Planished:	Other Process: N/A
Area Repaired:	N/A Repair Level A: 0 Lev	vel B: 0 Level C: 0
Material Type:	2195 AL-LI Material	Thickness: 0 200 "
Penetrant Type/Method:	I/A Test Tech	nnician: K. Wılliams
Penetrant System Used:	MANUAL	Contact: Johnny Dingler
Requesting Organization	: MMC/NASA Per	netrant: Ardrox P135E
Sensitivity Group:	III Dev	veloper: N/A
Wash:	Water	
General Comments:	WELD INSPECTED FROM 0 0"- 23.	0".
	DISCREPANCY	
COVER PASS		
Discrepancy: IN	FORMATION ONLY	
NO DIS	CREPANCIES NOTED.	
ROOT PASS		

Discrepancy: ☑ INFORMATION ONLY

0.250" LINEAR INDICATION NOTED ALONG TOE OF ROOT PASS, P-

227 SIDE @ 8.75", WILL USE AS IS.

Technician Rush William Date 9-25-98

LMMSS, MSFC DIVISION

#17RP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F021

Split Panel: N/A

Test Date: 9/25/98

Weld Area: REPAIR

Planished: Other Process: N/A

Level C: 0

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-17

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Density: 2.0 - 4.0

Film No: 2

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Film Size: 8" X 10"

MA: 10

KV: 86

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy
A	1	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	NO INDICATIONS NOTED.

L Por = Linear Porosity PI = Penetration Line LP = Lack of Penetration UC = Undercut OI = Oxide Inclusion LF = Lack of Fusion UF = Underfill C = Crack HI = Heavy Inclusion CC = Crater Crack BT = Burn Through CS = Cold Shut EP = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician

Date

LMMSS, MSFC DIVISION

#17RP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F021

Split Panel: N/A

Test Date: 9/29/98

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-17

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 6

X-Ray Interpreted By: K Williams

Film Type: KODAK M

Density: 20-40

Film Size: 8" X 10"

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	(2) LINEAR INDICATIONS NOTED AT 8.5", LONGEST IS 0.500" IN LENGTH.
Α	2	INFO ONLY	NO INDICATIONS NOTED.
Α	3	INFO ONLY	SAME AS VIEW 1.
В	1	INFO ONLY	LINEAR INDICATION NOTED AT 175", 0.250" IN LENGTH. LINEAR INDICATION NOTED AT 19.5", 1.125" IN LENGTH.
В	2	INFO ONLY	NO INDICATIONS NOTED
В	3	INFO ONLY	SAME AS VIEW 1.

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician Kealusella

Date 9-29-98

LMMSS, MSFC DIVISION

#17RP6

Program Name: Misc Test

Program Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F021

Split Panel: N/A

Test Date: 10/1/98

Weld Area: INITIAL

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 6

Level B: 6

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-17

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K Williams

Film Type: KODAK M

Density: 20-40

Film Size: 8" X 10"

MA: 10

KV: 86

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	POROSITY NOTED, WITHIN SPECS.
В	1	INFO ONLY	POROSITY NOTED, WITHIN SPECS.

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician Buch William

Date 10-1-98

LMMSS, MSFC DIVISION

#17RP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F021

Split Panel: N/A

Test Date: 10/5/98

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 6

Level B: 6

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-17

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K Williams

Film No: 6

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Density: 2.0 - 40

Film Size: 8" X 10"

MA: 10

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY

KV: 85

Frame	View	Status	Discrepancy
A	1	INFO ONLY	POROSITY NOTED, WITHIN SPECS.
Α	2	INFO ONLY	POROSITY NOTED, WITHIN SPECS
Α	3	INFO ONLY	POROSITY NOTED, WITHIN SPECS.
В	1	INFO ONLY	FAINT LINEAR INDICATION NOTED AT 1775", 0.175" IN LENGTH. POROSITY NOTED, WITHIN SPECS
В	2	INFO ONLY	POROSITY NOTED, WITHIN SPECS.
В	3	INFO ONLY	POROSITY NOTED, WITHIN SPECS

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Kick Will ____ Date 10-5-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#17RP6

Project: Misc Test

Project Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Test Date: 10/5/98

Specification Used: For Information Only

Welded Panel ID: F021

Split Panel: N/A

Weld Area: REPAIR

Planished: |\Sigma

Other Process: N/A

Area Repaired: N/A

Repair Level A: 6

Level B: 6

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Penetrant Type/Method: I/A

Test Technician: K Williams

Penetrant System Used: MANUAL

Contact:

Requesting Organization: MMC/NASA

Penetrant: Ardrox P135E

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: WELD INSPECTED IN REPAIR AREAS ONLY

DISCREPANCY

COVER PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM

5.0"- 7.0", 8.0"- 8.75", P-227 SIDE.

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 4.5"- 10 25" & 15.25"- 20.5", P-224 SIDE CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 4 0"- 5.0", 7.25"- 10.0", & 15.0"-

20.5", P-227 SIDE.

Technician Weigh della Date 15-5-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#17 RP6

				
Project:	Misc Test			
Project Description:	0 200", 2195P/ 21 3", 70%P, SHAVE		PANEL, VP	PA, VERTICAL, FL-R5-
Test Date:	10/5/98	Specification Us	ed: For Info	rmation Only
Welded Panel ID:	F021	Split Pan	iel: N/A	
Weld Area:	REPAIR	Planished: 🗵	Other Pro	cess: S3
Area Repaired:	N/A Repair	Level A: 6	Level B: 6	Level C: 0
Material Type:	2195 AL-LI	Mate	rial Thicknes	ss: 0 200 "
Penetrant Type/Method:	I/A	Test 1	echnician:	K. Williams
Penetrant System Used:	MANUAL		Contact:	Johnny Dingler
Requesting Organization	: MMC/NASA		Penetrant:	Ardrox P135E
Sensitivity Group:	III		Developer:	N/A
Wash:	Water			
General Comments:	WELD INSPECT	ED IN REPAIR	AREAS ON	LY.
	DISC	REPANCY		
COVER PASS				
Discrepancy: IN	FORMATION ONL	- Y		
NO DIS	CREPANCIES NO	DTED AFTER SA	ANDING ON	CE.
ROOT PASS				
Discrepancy: IN	FORMATION ONL	. Y		

NO DISCREPANCIES NOTED AFTER SANDING THREE TIMES.

Technician Neich Wella Date 10-5-98

LMMSS, MSFC DIVISION

#17RP7

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

KV: 86

Welded Panel ID: F022

Split Panel: N/A

Test Date: 9/25/98

Weld Area: INITIAL

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 0

Level B: 0

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-17

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K. Williams

Film Type: KODAK M Film Size: 4.5" X 17"

Density: 2.0 - 40

FFD: 49 in.

Time: 30 sec.

MA: 10

Comments: WELD INSPECTED FROM 0.0"- 23.5".

Frame	View	Status	Discrepancy
0.0"- 23.5"	1	INFO ONLY	NO INDICATIONS NOTED.

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line LF = Lack of Fusion UC = Undercut OI = Oxide Inclusion UF = Underfill C = Crack HI = Heavy Inclusion BT = Burn Through CC = Crater Crack CS = Cold Shut = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician

Date 9-25-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#17RP7

Project:	Misc Test				
Project Description:	0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-3", 70%P, SHAVED.				
Test Date:	9/25/98	Specification Used: For Information Only		rmation Only	
Welded Panel ID:	F022	22 Split Panel: N/A			
Weld Area:	INITIAL	Planished: 🔲	Other Pro	cess: N/A	
Area Repaired:	N/A Repair i	Level A: 0	Level B: 0	Level C: 0	
Material Type:	2195 AL-LI	Mater	rial Thicknes	ss: 0.200 "	
Penetrant Type/Method:	1/A	Test T	echnician:	K. Williams	
Penetrant System Used:	MANUAL Contact: Johnny Dingle		Johnny Dingler		
Requesting Organization	: MMC/NASA		Penetrant:	Ardrox P135E	
Sensitivity Group:	111	I	Developer:	N/A	
Wash:	Water				
General Comments:	WELD INSPECT	ED FROM 0.0"-	23.5".		
	DISCI	REPANCY			
COVER PASS					
Discrepancy: IN	FORMATION ONL	Y			
NO DIS	CREPANCIES NO	TED.			
ROOT PASS					
Discrepancy: IN	FORMATION ONL	Y			
NO DIS	CREPANCIES NO	TED			

Technician	Will Willi -	Date	9-25-98	
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LMMSS, MSFC DIVISION

#17RP7

Program Name: Misc Test

Program Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F022

Split Panel: N/A

Test Date: 9/26/98

Weld Area: INITIAL

Planished: Other Process: N/A

Level C: 0

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-17

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Density: 2.0 - 4.0

Film No: 2

X-Ray Interpreted By: K. Williams

Acceptance Specification: For Information Only

Film Type: KODAK M

Film Size: 8" X 10"

MA: 10

KV: 86

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy	
Α	1	INFO ONLY	NO INDICATIONS NOTED.	
В	1	INFO ONLY	NO INDICATIONS NOTED.	

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC ≃ Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Date 9-25-47

LMMSS, MSFC DIVISION

#17RP7

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F022

Split Panel: N/A

Test Date: 9/29/98

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-17

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K Williams

Film No: 6

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Density: 2.0 - 4 0

Film Size: 8" X 10"

MA: 10

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	NO INDICATIONS NOTED.
Α	2	INFO ONLY	NO INDICATIONS NOTED
Α	3	INFO ONLY	NO INDICATIONS NOTED.
В	1	INFO ONLY	LINEAR INDICATION NOTED AT 195", 0.300" IN LENGTH.
В	2	INFO ONLY	NO INDICATIONS NOTED.
В	3	INFO ONLY	SAME AS VIEW 1

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	Of = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician Kicklifthin Date 7-29-98

SLWT PENETRANT INSPECTION REPORT

LMMSS. MSFC DIVISION

#16RP7

Project: Misc Test

Project Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Test Date: 9/29/98

Specification Used: For Information Only

Welded Panel ID: F022

Split Panel: N/A

Weld Area: REPAIR

Planished: ⊠

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Penetrant Type/Method: I/A

Test Technician: K. Williams

Penetrant System Used: MANUAL

Contact: Johnny Dingler

Requesting Organization: MMC/NASA

Penetrant: Ardrox P135E

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: WELD INSPECTED IN REPAIR AREAS ONLY

DISCREPANCY

COVER PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 5.0"- 5 25", 6.5"- 8.5", 18.5"- 19.5", & 20 25"- 20.5", P-213 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 4 0"- 5.5",

7 75"- 8.25", 15.75"- 17.0", & 18 25"- 20 0", P-128 SIDE.

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 4.0"- 6.5", 7.0"- 8.75", & 16.0"- 20.0", P-213 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 7.5"- 7.75", &

17.5"- 17.75", P-128 SIDE.

Technician Rich Will - Date 9-29-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#17RP7

Project:	Misc Test			
Project Description:	0 200", 2195P/ 2195P, ST 3", 70%P, SHAVED.	TANDARD PANEL,	VPPA, VERTI	CAL, FL-R5-

Test Date: 9/30/98 Specification Used: For Information Only

Welded Panel ID: F022 Split Panel: N/A

Weld Area: REPAIR Planished:

☐ Other Process: S1

Area Repaired: N/A Repair Level A: 5 Level B: 5 Level C: 0

Material Type: 2195 AL-LI Material Thickness: 0 200 "

Penetrant Type/Method: I/A Test Technician: K Williams

Penetrant System Used: MANUAL Contact: Johnny Dingler

Requesting Organization: MMC/NASA Penetrant: Ardrox P135E

Sensitivity Group: III Developer: N/A

Wash: Water

General Comments: WELD INSPECTED IN REPAIR AREAS ONLY

DISCREPANCY

COVER PASS

Discrepancy: INFORMATION ONLY

NO DISCREPANCIES NOTED AFTER SANDING ONCE

ROOT PASS

Discrepancy:

INFORMATION ONLY

NO DISCREPANCIES NOTED AFTER SANDING ONCE

Technician Hickard Date 9-30-92

LMMSS, MSFC DIVISION

			,	•	_
Program	Name:	FI	Wi	R	C

Program Description: SLWT

Welded Panel ID: 18-RO1-TW

Split Panel:

Weld Area:

Planished: Other Process:

Area Repaired:

Repair Level A:

Level B:

Level C:

Material Type: AL 2195 T8

Material Thickness: ,200

Wire Type: Cham 18 X-Ray Unit: 4702/4711 Bly

Acceptance Specification: 504 C

X-Rayed By: O. STRONS

Film No: 2

X-Ray Interpreted By:

Density: 2.6 - 4.0

Film Type: M

Film Size: 4,5 x/7

MA: 15/10

Comments:

KV: 70

FFD:

in. 52 Time:

sec. 3ථ

Frame View Status	Discrepancy	
ROITW	NONE	
R5 RO1 V1(A)(B)	NONE	
R5 ROL V2(A)(B)	NONE	
<i>R</i> 5 ·		

LP = Lack of Penetration

L Por = Linear Porosity

PI = Penetration Line

LF = Lack of Fusion

UC = Undercut UF = Underfill

OI = Oxide Inclusion HI = Heavy Inclusion

C = Crack CC = Crater Crack Por = Porosity

BT = Burn Through

CS = Cold Shut

EP = Excessive Penetration

Sh = Shrinkage

Technician

Date

LMMSS, MSFC DIVISION

Program N	ame:	F-IV	′/	R	Ē
					_

Program Description: 5にいて

・Welded Panel ID: 18-R02-エル

Split Panel: Planished: Other Process:

Test Date:

Weld Area:

Area Repaired: Repair Level A:

Level B:

Level C:

Material Type: AL 2195 - T8

Material Thickness: ついた

Wire Type:

Acceptance Specification: 504C

X-Ray Unit: 8/494702 /47/1

X-Rayed By: 51720NG

Film No: Z Film Type: M

X-Ray Interpreted By: STROWS

Film Size: 4.5 X17

Density: 2,0-4.0 MA: 15/ 10 KV: 70/69 FFD:

in.52/ Time:

sec. 30

View Discrepancy Frame **Status** NONE 18 ROZ-IW R5 ROZ-VIA uNACCEPTOBLE R5 R02-12A R5 R62 V3A

LP = Lack of Penetration

L Por = Linear Porosity

PI = Penetration Line

LF = Lack of Fusion

UC = Undercut

OI = Oxide inclusion

C = Crack

UF = Underfill

HI = Heavy Inclusion

CC = Crater Crack Por = Porosity

BT = Burn Through

= Excessive Penetration

CS = Cold Shut

Sh = Shrinkage

LMMSS, MSFC DIVISION

Program	Name:	F/Wi	RE

Program Description: 5LWT

Welded Panel ID: 18 RO3- TW Split Panel:

Weld Area:

Planished: Other Process:

Area Repaired:

Repair Level A:

Level B:

Level C:

Material Type: AL 2195 T8

Material Thickness: , 200

Wire Type: Chcm 18

Acceptance Specification: 504

X-Ray Unit:

Film No: し

X-Rayed By: D. STRONG X-Ray Interpreted By:

Film Type: M

Density: 2.0 - 4.0

Film Size: 4.5×17

MA: 15 KV: 70

FFD:

in. 52_Time:

sec. 30

Comments:

View **Discrepancy** Frame Status

OK.

POR AT 13" size About , DZO-, 025/ H.I AT 30" 512e ,010.

LP = Lack of Penetration

L Por = Linear Porosity

PI = Penetration Line

LF = Lack of Fusion

UC = Undercut

OI = Oxide Inclusion

CC = Crater Crack

C = Crack

UF = Underfill

HI = Heavy Inclusion

Por = Porosity

BT = Burn Through EP = Excessive Penetration CS = Cold Shut Sh = Shrinkage

LMMSS, MSFC D	VISION
Program Name: F/W.RC Program Description: Welded Panel ID: 18 - RO4-IA Weld Area: 0-24 Plants	Split Panel: Test Date: 10/13/9
Area Repaired: Repair Level A Material Type: AL 2195-Te Material Thickness: .200 Acceptance Specification: MI=C-504C X-Rayed By: D. STRONS X-Ray Interpreted By: D. STRONS Density: 2.0-4.0 MA: 15//C KV: 70/29 F Comments:	Wire Type: X-Ray Unit: Film No: Film Type:
Frame View Status Discrepa	ncy
"0-24" NON	IE
18-RHNIAEB CK, AT 8"CER AT1614"E 161/2 SIZE .050	ter of Weld, POR AT 7/2". 030/
18-ROY V 2 A ÉB POR. AT 714"	Size . 640 AND POPIÉCK AT 8'
8-ROY - VZAEB POR. AT 16/4 & 16/2	5,2 = About .060/.050
8-ROY - VZAEB POR. AT 16/4 & 16/2 8-ROY - V3ACB, PORAT 7/4 5120.030	and POR AT 8" / V3B POR, AT.

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line UC = Undercut OI = Oxide Inclusion LF = Lack of Fusion UF = Underfill HI = Heavy Inclusion C = Crack BT = Burn Through CS = Cold Shut CC = Crater Crack = Excessive Penetration Por = Porosity Sh = Shrinkage

Cut Acouns

Technician Depter D. Hong Date 10/13/96

LMMSS, MSFC DIVISION

Program Name:

FlWiRE

Program Description:

Welded Panel ID:

18 ROS IW

Split Panel:

Test Date: ///4/96

Weld Area:

Planished: Other Process: VPPA

Area Repaired:

Repair Level A:

Level B:

Level C:

Material Type: AL. 2195 TS

Wire Type: Chem 18

Material Thickness: ,200

504C

X-Ray Unit:

Acceptance Specification: D. STRONG X-Rayed By:

Film No:

Film Type:

X-Ray Interpreted By: 2.0-4.0

Film Size: 4.5 x 17

Density: · KV: 70 MA: 15

in. 与乙Time: FFD:

sec. ≥△

Comments:

Frame

View

Status

Discrepancy

NONE

LP = Lack of Penetration LF = Lack of Fusion C = Crack

CC = Crater Crack Por = Porosity

L Por = Linear Porosity

UC = Undercut UF = Underfill BT = Burn Through EP = Excessive Penetration PI = Penetration Line Of = Oxide Inclusion

Hi = Heavy Inclusion CS = Cold Shut Sh = Shnnkage

RADIOGRAPHIC INSPECTION REPORT

Program Name:

EH23 Weld Panel Traceability

Program Description:

F/Wire

ID: 18R05R5

Report Date: 12-18-96

Material Type: AL 2195-T8

Material Thickness: .200"

X-ray unit: Philips 320KV

Acceptance Specification: None

Film no.: 6

Radiographer: Dexter Strong

Film type: Kodak M

Interpreted by: Dexter Strong/Linda Clark Film size: 4.5" x 17"

MA: 10 KV: 74 FFD: 48" Time: 0.6 min.

<u>Frame</u>	<u>View</u>	<u>Status</u>	<u>Discrepancy</u>
A	1		No indications noted
В	1		No indications noted
A	2		No indications noted
B	2		No indications noted
A	3		No indications noted
B	3		No indications noted

LMMSS, MSFC DIVISION

Program Name: F/WIRE

Program Description: SLWT

Test Date: 10/13/96 Welded Panel ID: 18 RRI- IW Split Panel:

Planished: Other Process: VPPA Weld Area:

Area Repaired: Repair Level A: Level B: Level C:

Material Type: AL 2195-T8

Material Thickness: , 200 Wire Type: X-Ray Unit: Acceptance Specification: 504

X-Rayed By: D STRONG Film No:

Film Type: X-Ray interpreted By:

Film Size: 4.5 x 17 Density: 2 - 4,0

MA: 75 in. 52 Time: sec. 30 KV: 70 FFD:

Comments:

View **Discrepancy** I.W. L.F. AT 234 to 41/2 Status UNACCEPTable.

RSP	V1	OK	
RSP	V2	OK	
R5P	V3	OK	

LP = Lack of Penetration

LF = Lack of Fusion C = Crack

CC = Crater Crack Por = Porosity

L Por = Linear Porosity

UC = Undercut UF = Underfill

BT = Burn Through EP = Excessive Penetration PI = Penetration Line

OI = Oxide Inclusion HI = Heavy inclusion

CS = Cold Shut Sh = Shrinkage

RADIOGRAPHIC INSPECTION REPORT

Program Name: EH23 Weld Panel Traceability

Program Description: F/Wire

ID: 18RP1R5P Report Date: 12-18-96

Material Type: AL 2195-T8

Material Thickness: .200" X-ray unit: Philips 320KV

Acceptance Specification: None Film no.: 6

Radiographer: Dexter Strong Film type: Kodak M

Interpreted by: Dexter Strong/Linda Clark Film size: 4.5" x 17"

MA: 10 KV: 74 FFD: 48" Time: 0.6 min.

<u>Frame</u>	<u>View</u>	<u>Status</u>	Discrepancy
A	1		No indications noted
В	1		No indications noted
A	2		No indications noted
В	2	acceptable	HDI at 15" ~ .005"
A	3	·	No indications noted
В	3	acceptable	HDI at 15" ~ .005"

HDI - high density indication

Technician

Date

RADIOGRAPHIC INSPECTION REPORT

Program Name:

EH23 Weld Panel Traceability

Program Description: F/Wire

ID: 18RP2R5P

Report Date: 12-18-96

Material Type: AL 2195-T8

Material Thickness: .200"

X-ray unit: Philips 320KV

Acceptance Specification: None

Film no.: 6

Radiographer: Dexter Strong

Film type: Kodak M

Interpreted by: Dexter Strong/Linda Clark

Film size: 4.5" x 17"

MA: 10 KV: 74 FFD: 48" Time: 0.6 min.

<u>Frame</u>	<u>View</u>	<u>Status</u>	Discrepancy
Α	1		No indications noted
В	1		No indications noted
A	2		No indications noted
В	2		No indications noted
A	3	acceptable	scratch on film at ~ 10" (non- relevant)
В	3		No indications noted

Technician Veff W. Hom Date 11/96

RADIOGRAPHIC INSPECTION REPORT

Program Name:

EH23 Weld Panel Traceability

Program Description:

F/Wire

ID: 18RP3R5P

Report Date: 12-18-96

Material Type: AL 2195-T8

Material Thickness: .200"

X-ray unit: Philips 320KV

Acceptance Specification: None

Film no.: 6

Radiographer: Dexter Strong

Film type: Kodak M

Interpreted by: Dexter Strong/Linda Clark

Film size: 4.5" x 17"

MA: 10

KV: 74 FFD: 48"

Time: 0.6 min.

<u>Frame</u>	<u>View</u>	<u>Status</u>	Discrepancy
A	1		No indications noted
В	1		No indications noted
A	2	acceptable	scratches on film from 5"-6"
		-	(non-relevant)
В	2		No indications noted
A	3		No indications noted
В	3		No indications noted

RADIOGRAPHIC INSPECTION REPORT

Program Name:

EH23 Weld Panel Traceability

Program Description:

F/Wire

ID: 18RP4R6

Report Date: 12-18-96

Material Type: AL 2195-T8

Material Thickness: .200"

X-ray unit: Philips 320KV

Acceptance Specification: None

Film no.: 2

Radiographer: Dexter Strong

Film type: Kodak M

Interpreted by: Dexter Strong/Linda Clark

Film size: 4.5" x 17"

MA: 10 KV: 74 FFD: 48" Time: 0.6 min.

<u>Frame</u>	<u>View</u>	<u>Status</u>	<u>Discrepancy</u>
A	1	acceptable	slag inclusion at ~ 10"
В	1	acceptable	porosity at ~ 19", 2 pieces .020

diameter

LMMSS, MSFC DIVISION

Program Name:	FIWIRE
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Program Description: 5247

Welded Panel ID: 18 RAS-IW Split Panel: Test Date:

Weld Area: Planished: ■ Other Process: V PPIA

Area Repaired: Repair Level A: Level B: Level C:

Material Type: AL 2195-TS

Material Thickness: 200 Wire Type: Chem 18

Acceptance Specification: 5640 X-Ray Unit:

X-Rayed By: D.57720N5 Film No: 2

X-Ray Interpreted By: Film Type: M

Density: 2.6 - 4.0 Film Size: 4,5 x 17

MA: 15 KV: 70 FFD: in. 52 Time: sec. 30

Comments:

Frame View Status Discrepancy

NONE

•R5 NONE

LP = Lack of Penetration L Por = Linear Porosity PI = Penetration Line LF = Lack of Fusion UC = Undercut OI = Oxide Inclusion = Underfill C = Crack UF HI = Heavy Inclusion CC = Crater Crack BT = Burn Through CS = Cold Shut = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician Wifter 1. Strong Date 10/13/96

LMMSS, MSFC DIVISION

#18RP7

Program Name: Misc Test

Program Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

Repair Level A: 0

3", 70%P, SHAVED.

Welded Panel ID: F018

Split Panel: N/A Test Date: 9/25/98

Weld Area: INITIAL

Planished: Other Process: N/A

Area Repaired: N/A

Level B: 0

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-18

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K Williams

Film No: 2

X-Ray Interpreted By: K. Williams

Film Type: KODAK M Film Size: 4.5" X 17"

Density: 20 - 4.0

FED: 40 :-

MA: 10

KV: 86

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED FROM 0.0"- 23.5".

Frame	View	Status	Discrepancy
0.0"- 23.5"	1	INFO ONLY	NO INDICATIONS NOTED.

Technician

Wil william

Date

9-25-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#18RP7

Project:	Misc Test		. .		
•	0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-3", 70%P, SHAVED				
Test Date:	9/25/98 Specification Used: For Information Only		nation Only		
Welded Panel ID:	F018 Split Panel: N/A				
Weld Area:	INITIAL Planis	TIAL Planished: Other Process: N/A			
Area Repaired:	N/A Repair Level A	A: 0 Level B: 0	Level C: 0		
Material Type:	2195 AL-LI	Material Thickness	: 0.200 "		
Penetrant Type/Method:	I/A	Test Technician: K	. Williams		
Penetrant System Used:	MANUAL	Contact: A	ndre' Paseur		
Requesting Organization	n: MMC/NASA	Penetrant: A	rdrox P135E		
Sensitivity Group:	111	Developer: N	/ A		
Wash:	Water				
General Comments:	WELD INSPECTED FR	ROM 0.0"- 23.0"			
DISCREPANCY					
COVER PASS					
Discrepancy: IN	FORMATION ONLY				
NO DIS	CREPANCIES NOTED				
ROOT PASS					
Discrepancy: IN	FORMATION ONLY				
NO DIS	CREPANCIES NOTED.				

Technician	Kinh William	Date	9-25-98
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LMMSS, MSFC DIVISION

Program Name: Misc Test

Program Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F018

Split Panel: N/A

Test Date: 9/26/98

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-18

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K. Williams

Film Type: KODAK M Film Size: 8" X 10"

Density: 2.0 - 4.0

Time: 30 sec.

MA: 10

KV: 86

FFD: 49 in.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	NO INDICATIONS NOTED.
В	1	INFO ONLY	RANDOM POROSITY NOTED, NOT IN EXCESS OF SPECS

P = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
F = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
= Crack	UF = Underfill	HI = Heavy Inclusion
C = Crater Crack	BT = Burn Through	CS = Cold Shut
or = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Reich William.

Date 9-26-98

LMMSS, MSFC DIVISION

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F018

Split Panel: N/A

Test Date: 9/28/98

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0.200 "

Wire Type: C-18

X-Ray Unit: Phillips 220

Acceptance Specification: For Information Only

Film No: 6

X-Ray Interpreted By: K Williams

Film Type: KODAK M

Density: 2.0 - 40

X-Rayed By: K. Williams

Film Size: 8" X 10"

MA: 10

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY

Frame	View	Status	Discrepancy
A	1	INFO ONLY	NO INDICATIONS NOTED.
Α	2	INFO ONLY	NO INDICATIONS NOTED
Α	3	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	POROSITY NOTED, WITHIN SPECS
В	2	INFO ONLY	POROSITY NOTED, WITHIN SPECS
В	3	INFO ONLY	POROSITY NOTED, WITHIN SPECS.

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician

Kich William

Date 9-28-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#18RP7

Project: Misc Test

Project Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED

Test Date: 9/29/98

Specification Used: For Information Only

Welded Panel ID: F018

Split Panel: N/A

Weld Area: REPAIR

Planished: ⊠

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Penetrant Type/Method: 1/A

Test Technician: K. Williams

Penetrant System Used: MANUAL

Contact: Andre' Paseur

Requesting Organization: MMC/NASA

Penetrant: Ardrox P135E

Sensitivity Group: III

Developer: N/A

Wash: Water

General Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

DISCREPANCY

COVER PASS

Discrepancy:

 \boxtimes INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 4.5"- 7.5". 15.5"- 17.0". & 17 5"- 20.0", P229 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 70"-7.75",

15 0"- 16.0", & 18.75"- 20 0", P-239 SIDE

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE FROM 3.0"- 3.25", 4 0"- 4.75", 7.25"- 9 0", 16.0"- 17 0", & 19.0"- 20.5", P-229 SIDE. CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGE

FROM 3.0"- 3.75", 6.75"- 8.5", & 19 0"- 20 5", P-239 SIDE.

Technician Kuch William Date 9-29-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#18RP7

Project:	Misc Test							
Project Description:	0 200", 2195P/ 21 3", 70%P, SHAVE		PANEL, VPP	PA, VERTICAL, FL-R5-				
Test Date:	9/30/98	9/30/98 Specification Used: For Information Only						
Welded Panel ID:	F018	Split Pan	el: N/A					
Weld Area:	REPAIR	Planished: 🗵	Other Prod	cess: S1				
Area Repaired:	N/A Repair	Level A: 5	Level B: 5	Level C: 0				
Material Type:	2195 AL-LI	Mate	rial Thicknes	s: 0 200 "				
enetrant Type/Method:	I/A	/A Test Technician: K. Willia						
enetrant System Used:	MANUAL	Andre' Paseur						
equesting Organization	: MMC/NASA	MMC/NASA Penetrant: Ardrox P13						
Sensitivity Group:	111	Developer: N/A						
Wash:	Water							
General Comments:	WELD INSPECT	WELD INSPECTED IN REPAIR AREAS ONLY.						
	DISC	REPANCY	····					
COVER PASS								
Discrepancy: 🗌 IN	FORMATION ONL	LY						
NO DIS	CREPANCIES NO	OTED AFTER SA	ANDING ONC	DE				
ROOT PASS			<u> </u>					
Discrepancy: IN	FORMATION ONL	LY						
NO DIS	CREPANCIES NO	OTED AFTER SA	ANDING ON	CE.				

Technician Mich William Date 9-30-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT RADIOGRAPHIC INSPECTION REPORT

LMMSS, MSFC DIVISION

#18RP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F017

Split Panel: N/A

Test Date: 9/25/98

Weld Area: INITIAL

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 0

Level B: 0

Level C: 0

Material Type: 2195 AL-LI

Acceptance Specification: For Information Only

Material Thickness: 0.200 "

Wire Type: C-18

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K Williams

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 4.5" X 17"

MA: 10

KV: 86

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED FROM 0 0"- 23.5".

Frame	View	Status	Discrepancy
0.0"- 23.5"	1	INFO ONLY	NO INDICATIONS NOTED.

L Por = Linear Porosity LP = Lack of Penetration PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion UF = Underfill C = Crack HI = Heavy Inclusion BT = Burn Through CS = Cold Shut CC = Crater Crack = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician

Date 52-25-97

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#18RF6

Project:	Misc Test						
Project Description:	0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5- 3", 70%P, SHAVED.						
Test Date:	9/25/98 Sp	9/25/98 Specification Used: For Information					
Welded Panel ID:	F017	Split Panel: N/A					
Weld Area:	INITIAL P	Planished: 🔲 Other Pro	ocess: N/A				
Area Repaired:	N/A Repair Le	evel A: 0 Level B: 0	Level C: 0				
Material Type:	2195 AL-LI	Material Thickne	ss: 0 200 "				
Penetrant Type/Method:	I/A	Test Technician:	K. Williams				
Penetrant System Used:	MANUAL	Contact:	Andre' Paseur				
Requesting Organization	: MMC/NASA	Penetrant:	Ardrox P135E				
Sensitivity Group:	III	N/A					
Wash:	Water						
General Comments:	WELD INSPECTED	D FROM 0.0"- 23 5"					
	DISCR	EPANCY					
COVER PASS							
Discrepancy: 🔲 IN	FORMATION ONLY						
NO DIS	CREPANCIES NOT	ED					
ROOT PASS							
Discrepancy: 🔲 IN	FORMATION ONLY						
NO DIS	CREPANCIES NOT	ED					

Technician Nuch William. Date 9-25-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT RADIOGRAPHIC INSPECTION REPORT

LMMSS, MSFC DIVISION

#18RP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F017

Split Panel: N/A Test Date: 9/26/98

Weld Area: REPAIR

Planished: Other Process: N/A

Area Repaired: N/A

Repair Level A: 5 Level B: 5 Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-18

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 2

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Density: 2.0 - 4.0

Film Size: 8" X 10"

MA: 10

KV: 88

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY.

Frame	View	Status	Discrepancy
A	1	INFO ONLY	RANDOM POROSITY NOTED, WITHIN SPECS.
В	1	INFO ONLY	RANDOM POROSITY NOTED, WITHIN SPECS.

L Por = Linear Porosity LP = Lack of Penetration PI = Penetration Line UC = Undercut LF = Lack of Fusion OI = Oxide Inclusion UF = Underfill C = Crack HI = Heavy Inclusion BT = Burn Through CC = Crater Crack CS = Cold Shut EP = Excessive Penetration Por = Porosity Sh = Shrinkage

Technician

Kirk William

Date 9-26-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT RADIOGRAPHIC INSPECTION REPORT

LMMSS, MSFC DIVISION

#18PP6

Program Name: Misc Test

Program Description: 0 200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Welded Panel ID: F017

Split Panel: N/A

Test Date: 9/28/98

Weld Area: REPAIR

Planished: ⊠ Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Material Thickness: 0 200 "

Wire Type: C-18

Acceptance Specification: For Information Only

X-Ray Unit: Phillips 220

X-Rayed By: K. Williams

Film No: 6

X-Ray Interpreted By: K. Williams

Film Type: KODAK M

Density: 20-40

Film Size: 8" X 10"

MA: 10

KV: 85

FFD: 49 in.

Time: 30 sec.

Comments: WELD INSPECTED IN REPAIR AREAS ONLY

Frame	View	Status	Discrepancy
Α	1	INFO ONLY	FAINT LINEAR INDICATION NOTED FROM 6.5"-70" IN CENTER OF REPAIR AREA
Α	2	INFO ONLY	NO INDICATIONS NOTED.
Α	3	INFO ONLY	NO INDICATIONS NOTED
В	1	INFO ONLY	POROSITY NOTED, WITHIN SPECS.
В	2	INFO ONLY	POROSITY NOTED, WITHIN SPECS
В	3	INFO ONLY	POROSITY NOTED, WITHIN SPECS.

LP = Lack of Penetration	L Por = Linear Porosity	PI = Penetration Line
LF = Lack of Fusion	UC = Undercut	OI = Oxide Inclusion
C = Crack	UF = Underfill	HI = Heavy Inclusion
CC = Crater Crack	BT = Burn Through	CS = Cold Shut
Por = Porosity	EP = Excessive Penetration	Sh = Shrinkage

Technician Kink William.

Date 9-22-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

#18RP6

Project: Misc Test

Project Description: 0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-

3", 70%P, SHAVED.

Test Date: 9/30/98

Specification Used: For Information Only

Welded Panel ID: F017

Split Panel: N/A

Weld Area: REPAIR

Planished: 🖂

Other Process: N/A

Area Repaired: N/A

Repair Level A: 5

Level B: 5

Level C: 0

Material Type: 2195 AL-LI

Penetrant Type/Method: I/A

Material Thickness: 0 200 "

Penetrant System Used: MANUAL

Test Technician: K Williams

Contact: Andre' Paseur

Requesting Organization: MMC/NASA

Penetrant: Ardrox P135E

Sensitivity Group: |||

Developer: N/A

Wash: Water

General Comments: WELD INSPECTED IN REPAIR AREAS ONLY

DISCREPANCY

COVER PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGED FROM

3.5"- 7.0", 7.5"- 8.0", & 16 0"- 17.0", P-226 SIDE. CRACK LIKE

INDICATIONS NOTED ALONG PLANISHED EDGE FROM 3 5"- 3.75", 7.5"-

8.5", & 20.0"- 20.5", P-219 SIDE

ROOT PASS

Discrepancy:

INFORMATION ONLY

CRACK LIKE INDICATIONS NOTED ALONG PLANISHED EDGED FROM

3.25"- 5 0", 7 25"- 8 0", & 15.5"- 17.25", P-226 SIDE CRACK LIKE

INDICATIONS NOTED ALONG PLANISHED EDGE FROM 3 5"- 4.5", 5.5"-

6.5", 8.0"- 9.0", 16 0"- 17.25", & 19 0"- 20.5", P-219 SIDE

Technician Kick William Date G-3U-98

NONDESTRUCTIVE EVALUATION BRANCH SLWT PENETRANT INSPECTION REPORT

LMMSS, MSFC DIVISION

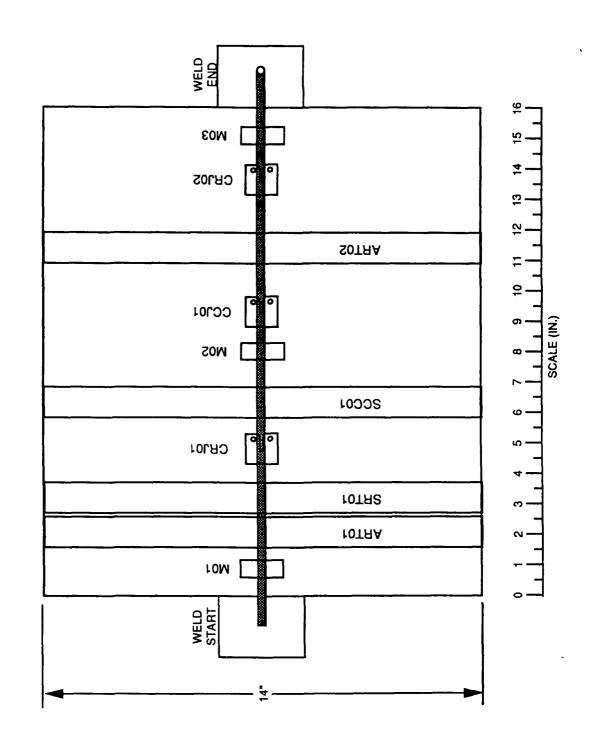
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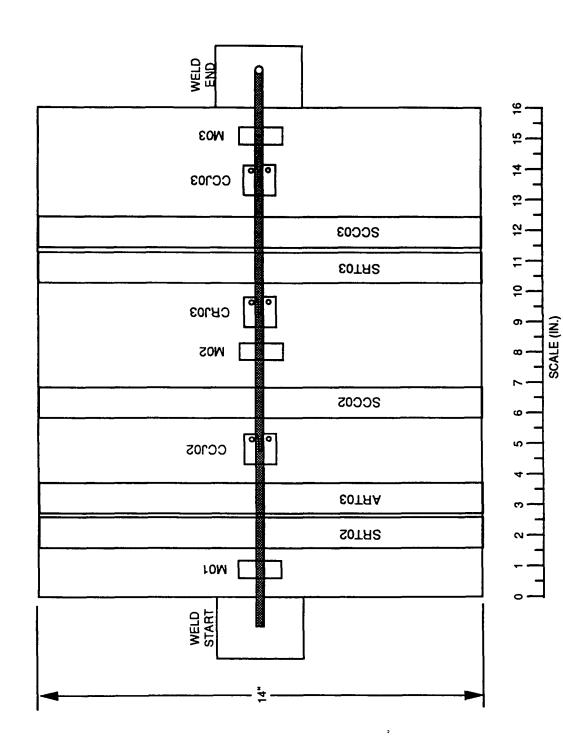
Project:	Misc Test						
Project Description:	0.200", 2195P/ 2195P, STANDARD PANEL, VPPA, VERTICAL, FL-R5-3", 70%P, SHAVED.						
Test Date:	9/30/98 S	nation Only					
Welded Panel ID:	F017	Split Pane	el: N/A				
Weld Area:	REPAIR I	Planished: 🖂	Other Proc	ess: S2			
Area Repaired:	N/A Repair L	.evel A: 5 L	evel B: 5	Level C: 0			
Material Type:	2195 AL-LI	Materi	al Thickness	s: 0 200 "			
Penetrant Type/Method:	I/A	Test Te	echnician: K	Williams			
Penetrant System Used:	MANUAL		Contact: A	indre' Paseur			
Requesting Organization	: MMC/NASA	!	Penetrant: A	ardrox P135E			
Sensitivity Group:	III	Developer: N/A					
Wash:	Water						
General Comments:	WELD INSPECTED IN REPAIR AREAS ONLY						
	DISCR	REPANCY					
COVER PASS					_		
Discrepancy: IN	FORMATION ONLY	1					
NO DIS	CREPANCIES NO	TED AFTER SA	NDING TWI	CE.			
ROOT PASS					_		
Discrepancy: 🔲 IN	FORMATION ONLY	1					
NO DIS	CREPANCIES NO	TED AFTER SA	NDING ONC	E.			

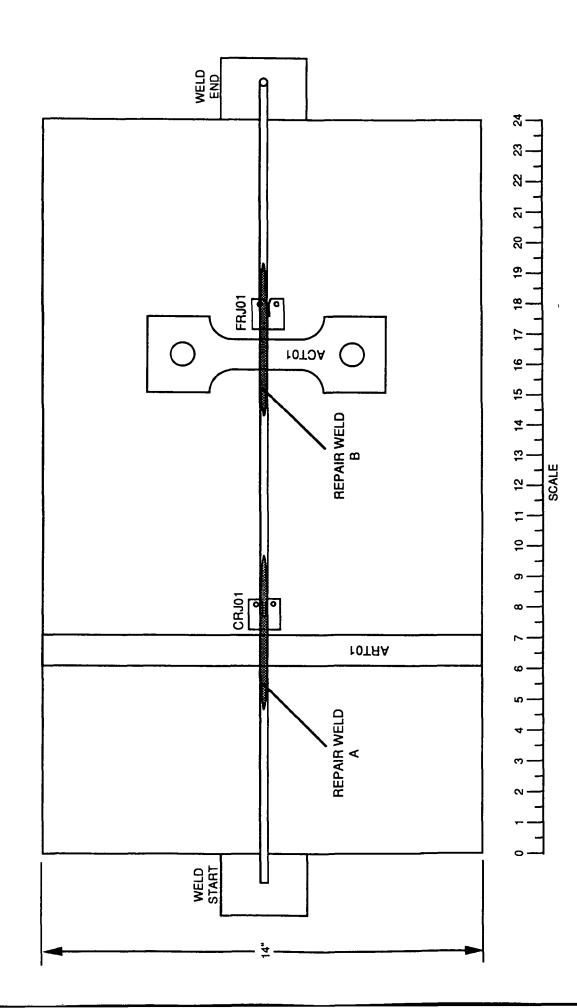
Technician Will Date 9-30-92

APPENDIX F WELD PANEL LAYOUT

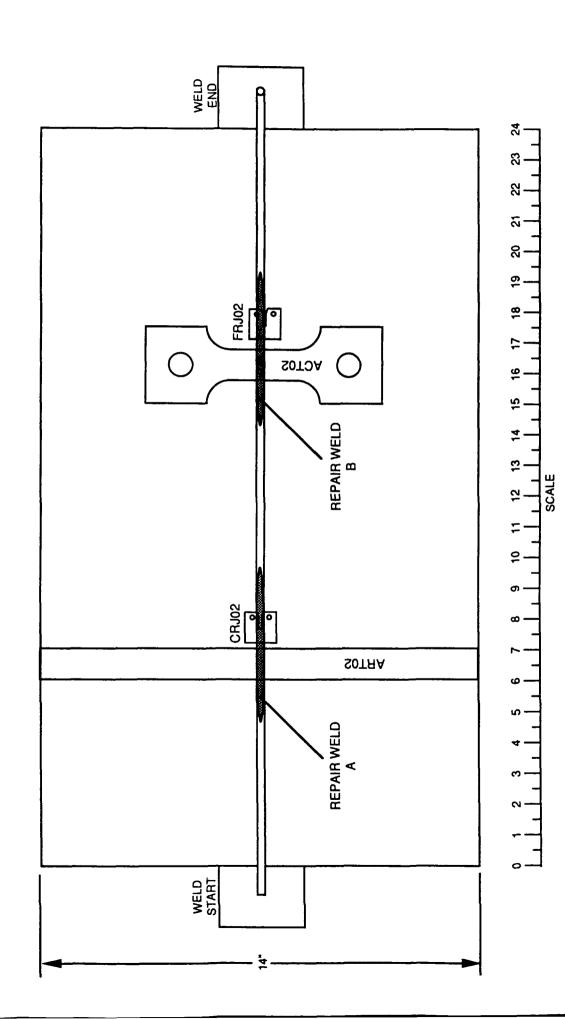
PART II FILLER WIRE DEVELOPMENT PROGRAM INITIAL WELD PANEL LAYOUT 0.320"t 2195-T8



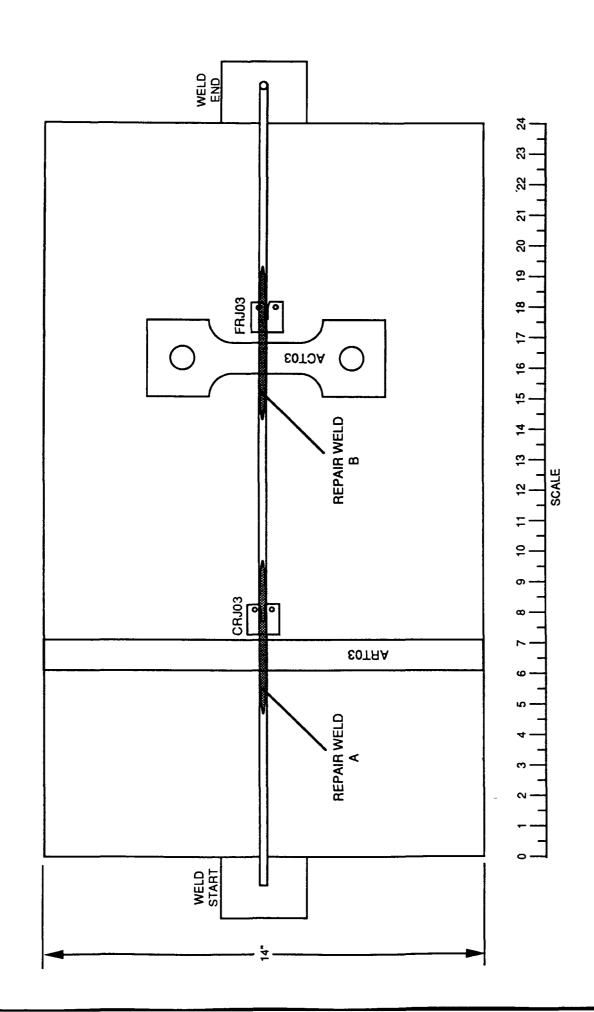


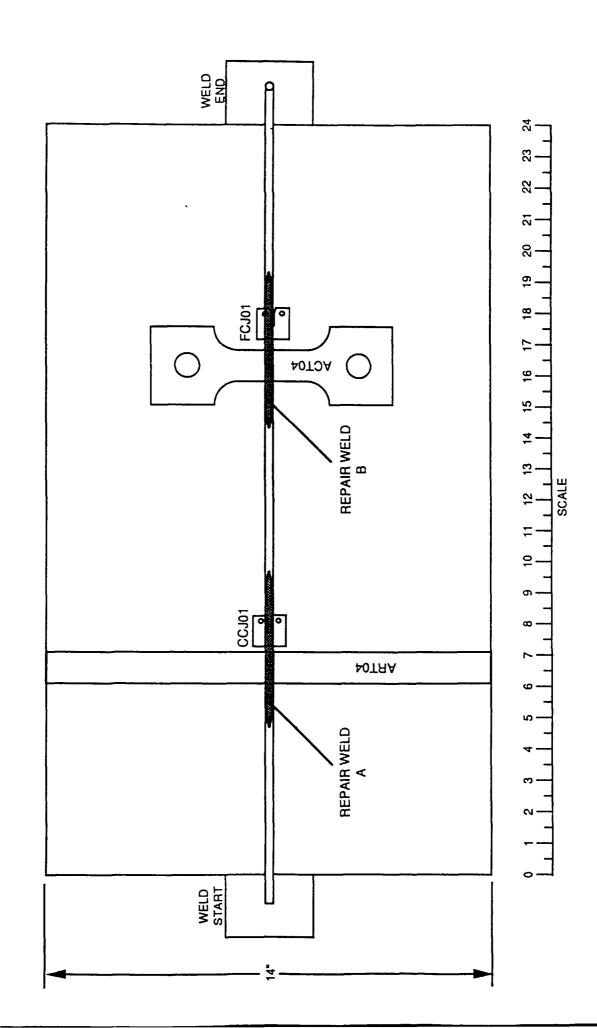


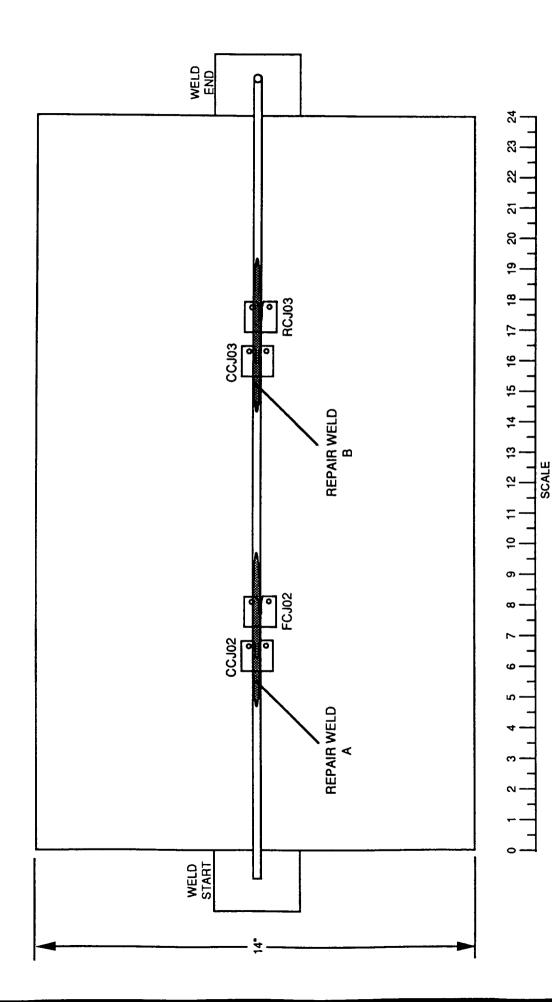
PART II FILLER WIRE DEVELOPMENT PROGRAM REPAIR WELD PANEL LAYOUT 0.200"t 2195-T8

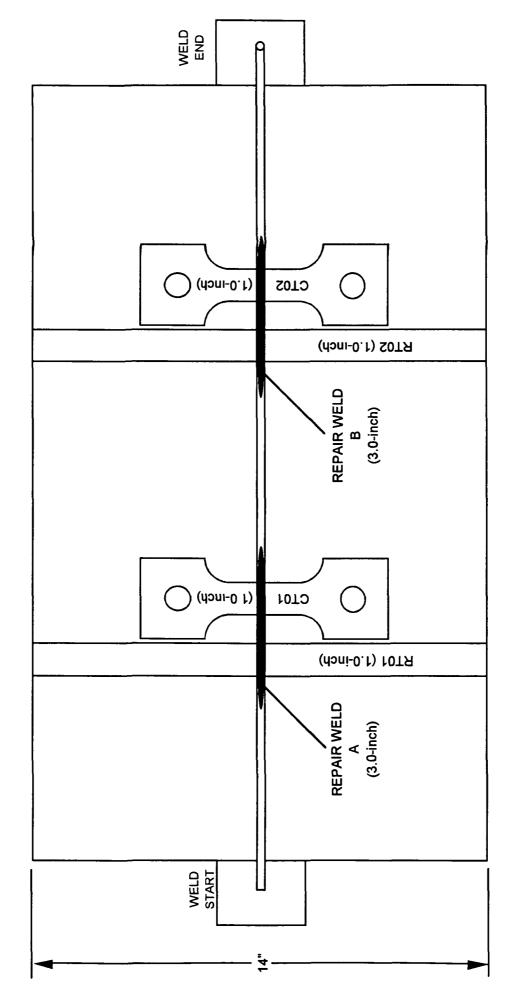


PART II FILLER WIRE DEVELOPMENT PROGRAM REPAIR WELD PANEL LAYOUT 0.200"t 2195-T8

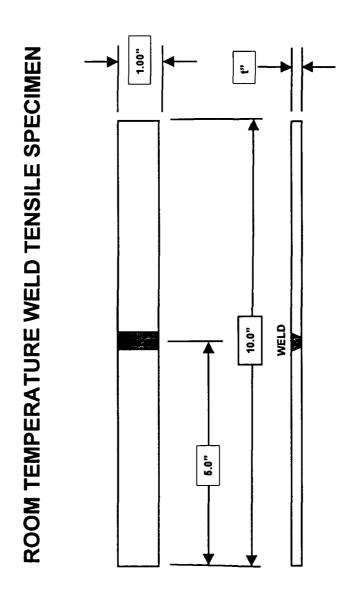




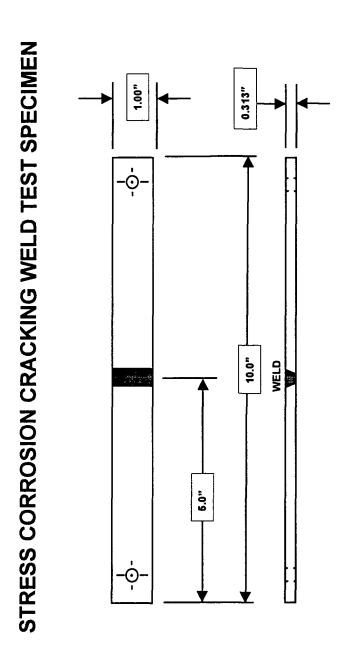


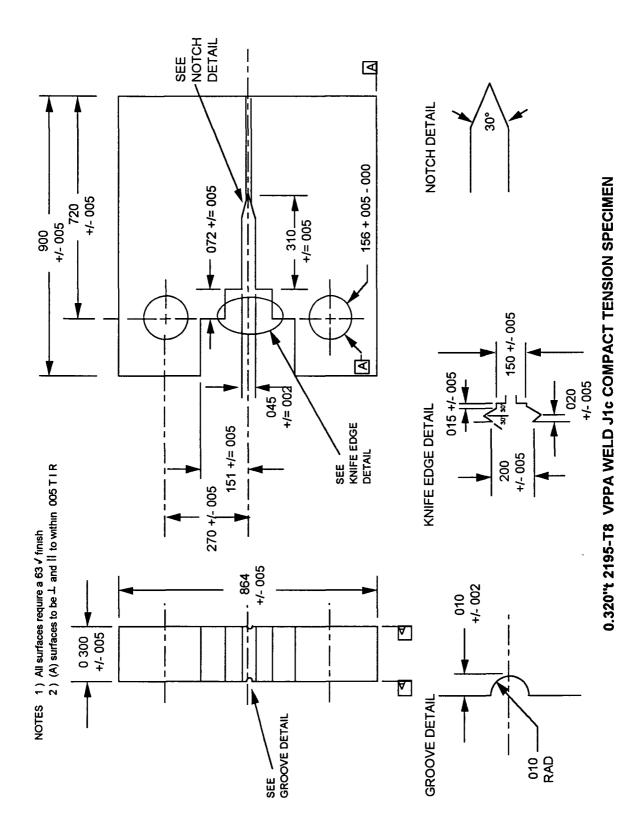


APPENDIX G WELD TEST SPECIMENS

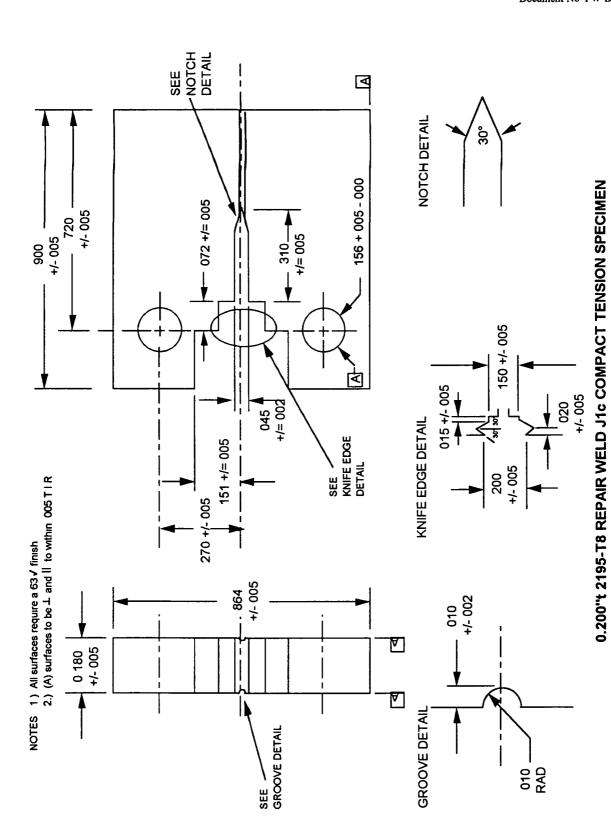


2.00" 0.200" LN2 TEMPERATURE WELD TENSILE SPECIMEN 1.00, 0.6"R WELD 7.376" 7.375" 1.00" 2.00" 1.126"





G-6



G-7

APPENDIX H VPPA WELD TENSILE DATA

PART II FILLER WIRE DEVELOPMENT PROGRAM

0.320t 2195PLATE/2195PLATE VPPA WELD TENSILE TEST DATA

			T	14515		4=1-01-0	N. T. C. V.C.	
FILLER	TEST	WELD	TEST	YIELD	ULTIMATE	%ELONG.	%ELONG.	UTLIMATE
CHEM	PANELS*	CONDITION	TEMP	(KSI)	(KSI)	(1.0 IN GAGE)	(2.0 IN GAGE)	STD DEV
#15	15A-SRT01	SHAVED	RT	Mis test	40.00	0.50	2.42	
600	15B-SRT02	SHAVED	RT	32 00	48 60	6 50	3 12	
6.0 Cu	15B-SRT03	SHAVED	RT	33 20	49 80	7 72	3 78	0.05
0.4 Mg	454 40704	AC MEL DED	AVG	32 60	49.20	7.11	3.45	0.85
0.4 Zn	15A-ART01	AS-WELDED	RT	38 20	54 60	4 57	2 32	
0.15 Ti	15A-ART02	AS-WELDED	RT	37 40	53 10	3 96	2 12	
0 16 Zr	15B-ART03	AS-WELDED	RT AVG	39 40 38.33	55 90 54.53	4 37 4 30	2 42 2 29	1.40
#10	404 00704	01141/50						1.40
#16	16A-SRT01	SHAVED	RT	32 40	49 00	8 02	3 78	
C A A	16B-SRT02	SHAVED	RT	34.20	50 50	7 41	3 73	
6.0 Cu	16B-SRT03	SHAVED	RT	32.30	49 70	9 34	4 63	2.75
0.4 Zn	404 40 704	AS INCLUSED	AVG	32.97	49.73	8.26	4 05	0 75
0.4 Ag	16A-ART01	AS-WELDED	RT	36 90	55 90	5 58	3 07	
0 25 Ti	16A-ART02	AS-WELDED	RT	36 20	55 20	6 60	3 27	1
0.25 Zr	16B-ART03	AS-WELDED	RT AVG	38 30	53 70	5 48	2 82	4.42
	474 00704	01445		37.13	54 93	5.89	3.05	1.12
#17	17A-SRT01	SHAVED	RT	32.50	49 90	6 60	3 27	
	17B-SRT02	SHAVED	RT	33.10	50 10	8 83	4 38	
6.0 Cu	17B-SRT03	SHAVED	RT	34.00	48 20	5 08	2 42	
0.4 Ag	474 40704	46.14(5), 0.50	AVG	33.20	49.40	6.84	3.36	1.04
0.4 Mg	17A-ART01	AS-WELDED	RT	37.80	56 20	6 19	3 17	
0.25 Ti	17A-ART02	AS-WELDED	RT	38.20	56 30	5 69	3 07	
0 25 Zr	17B-ART03	AS-WELDED	RT AVG	38 80 38.27	56 80 56 43	5 38 5.75	2 57 2.94	0.32
#18	18A-SRT01	CHAVED			48 90	7 31	3 38	0.32
#10	18B-SRT02	SHAVED	RT	32 70 32 30	50 30	8 93	4 33	
6.0 Cu	18B-SRT03	SHAVED SHAVED	RT RT	32 30	49 50	9 24	4 58	
0.4 Ag	18B-3R103	SHAVED	AVG	32.90	49 57	8.49	4 10	0.70
0.25 Ti	18A-ART01	AS-WELDED	RT	38 40	55 90	4 87	2 32	2.70
0.25 Tr	18A-ART02	AS-WELDED	RT	37 20	55 70	5 69	2 77	
0.25 21	18B-ART03	AS-WELDED	RT	35 40	55 90	6 29	317	6
	100-2000	AS-WELDED	MATERIAL VIOLEN	37.00	55.83	5 62	2.75	0.12
#19	19A-SRT01		1		49 00	8 43	3 88	20.12
m 13	19A-SRT01	SHAVED SHAVED	RT	32.10 32.10	50 90	9 04	4 38	
6.0 Cu	19A-SRT02	SHAVED	RT	32.10	49 30	8 73	4 48	
0.0 Cu	19A-3K103	SHAVED	4.3 44.0.64.54.00		49.73	8.73	4 25	1.02
0 25 Ti	19A-ART01	AS-WELDED	RT	37 80	56 70	5 48	2 92	
- 40 11	19A-ART02	AS-WELDED	RT	36 20	52 20	4 37	2 02	
	19A-ART03	AS-WELDED	RT	37 10	56 30	5 89	267	
	10,1,1100	7.0 11.22.02.0	#AVG#	37.03	55.07	5.25	2.54	2.49
#20	20A-SRT01	SHAVED	RT	33 00	50 50	7 92	4 03	
"20	20A-SRT02	SHAVED	RT	33.40	50 50	701	3 27	
6.0 Cu	20A-SRT03	SHAVED	RT	32 10	50 50	8 53	3 88	
0.4 Ag			#AVG#	32.83	50.50	7 82	3.73	0 00
0.4 Mn	20A-ART01	AS-WELDED	RT	38 30	57 30	5 79	2 82	
0.25 Ti	20A-ART02	AS-WELDED	RT	36.10	56 10	6 90	3 22	
J.20 11	20A-ART02	AS-WELDED	RT	38 20	55 90	5 18	2 72	
	207-71(103	NO-THELDED	AVG	37.53	56 43	5 96	2.92	0.76
	I		CAD					

PART II FILLER WIRE DEVELOPMENT PROGRAM

0.320t 2195PLATE/2195PLATE VPPA WELD TENSILE TEST DATA

FILLER	TEST	WELD	TEST	YIELD	ULTIMATE	%ELONG.	%ELONG.	UTLIMATE
CHEM	PANELS*	CONDITION	TEMP	(KSI)	(KSI)	(1.0 IN GAGE)	(2 0 IN GAGE)	STD DEV
4043**	C1***	SHAVED	RT	36 60	44 00	3 76	1 76	
	С3	SHAVED	RT	35 60	45 00	4 26	2 02	
5.2 Sı	C5	SHAVED	RT	36 30	46 80	3 76	1 91	
	C7	SHAVED	RT	34 60	43 10	3 65	1 66	£
	C9	SHAVED	RT	35 40	43 40	3 65	1 76	ie e
	a man tea		ÁVG	35.70	44.46	_3.82	1.82	1.50
	C2	AS-WELDED	RT	37 40	50 30	3 66	1 91	
	C4	AS-WELDED	RT	35 50	46 90	2 44	0 96	
	C6	AS-WELDED	RT	37 10	49 30	3 35	1 51	
	C8	AS-WELDED	RT	38 00	49 00	2.84	1 46	
	C10	AS-WELDED	RT	39 10	50 30	3 76	1 66	i.
			単AVG 無	37.42	49 16	3.21	1 50	1.39

MATERIALS CAI FFOTESE LAS . METALS COCCESE PRONTY WELD EVALUATION LAS

TE TILE TEST, I I CEFET VIELD

LIAD RAMJE, LBS	2-000	FILENA Æ TOR DIG«	M4452
PRE / PEST-YD STRAIT ANG	≟ , ≥	TEST PARAMETERS	TEST1
GAGE LEVETH, INCHES	1. 995	FAMEL J.D.	15 - ART
35Fya CONTROL FILEMAME	STAMDARD	=ROGRAM	STTF
		w <u>ELC PRCCES</u> S	VFFA
		MATERIAL	<i>2195</i>

* CH	Em #15	T As-	WELDE	O TEY	ISILE	DATA				2"	, **
HOR∢ ‡	SFEC ID	UD INCHES	THK INCHES	АК Е А 3 9. I'4	MPSI	. EX VD LES	, EX 15 KSI	ULT LBS	ULT KSI	2" *	I" Te Y.
97572	TƏ1	. 999	. 315	.315	11.9	12040	38.2	17190	34. b	2.32	4.57
97572	T02	1.002	. 314	.315	11.28	11770	37. ÷	16723	53 . 1	2.12	3.94
97572	Tos	1.003	.313	.314	11.45	12373	39. 4	17540	55. 9	2.42	4.37
AVERAGE		1.001	. 314	.314	11.51		38. 4		54.5	2.28	4.30
SD. DEV		0	ð	0	.268		.991		363	. 1539	0.310

03-04-1997 13:E0:+0

TEST CONCLUCTED BY GS

PATERIALS AND PROISS LAS PETALS AFFEEDS BRANCH GELT EVALUATION LAS

33.2 17000

21.7

18.23

49.8

42.9

3.78

2.65

10.93 1.42 **2.76**

7.7.

LOPO PANCE, PRE POST- BAGE LENGTA SERVO CONTA	- v Z = 3 7	STOAI) IDMES SILENAN	· <u>=</u>	2. 3. STA	35 NDARD	TEST PANE PROG WELD MATE	TARES L I.D. RAM CROTE RIAL		TE	PΆ		
	CHE) TEK#	M #15 SFEC II	ыD	THK INCHES		MSILE MODULUS MPSI		KSI .E% (D	ULT LB3	ULT KSI	2 " _{TE} _s	1 7. シ
975	573	T 0 1	.998	.34	. 339	9.97	ø	ð	10220	30.3 *	1 . 35 3	2.4
975	773	T 8 2	. 393	.343	. 343	10.14	10970	32	16660	-8. ś	3.12	6.5

97573 T03 1.002 .341 .342 9.5 11330

1 .341 .341

0 0 .333

03-04-1997 13:52:31 TEST CONDUCTED BY GS

AVERAGE

SD. DEV

* SAMPLE WAS TAKEN AT THE PANEL START WHERE LOF WAS LOCATED.

9**.** 87

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	-	• =		~ ' ~	16 - ART
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. , «	2.				ATH	ILE D	TEIS	VELUEN	, AS-1	m #16	* CHE
" " " " " " " " " " " " " " " " " " " "	<i>A</i>	 :::		2 Z E2		33 3 3 3 3	1931 53. 1 x	7 2 5	- 1		** *
5.58	 	-1.3	~~ _~ -	<u>-</u>			7.5	-	 	₋ ,	T 154.
6.60		EE, E	.:::::		. 145	.1.15	,		192	732	777-1
5.48	. 32			 	• • • •	7.5	-	`. :	<u>:</u>	?	·
5.89	I. 85	, 5		11.00 10.00 10.00		25	<u>:</u>	, 1.2	, 1-3		: ===:=
0.618		2		.:5							:-

		, , , ,		- 	 	- - 		n		6-5R	Γ	
- -	** *****				• ·		2		<u></u> .	- /-		
	* CHE	m#16	SHAL	IED WE	20 TE	MSILE	DATH	1			~ "	
		12 1		- . 5-33		25]		= 13 37			<u>d</u>	TE Y.
			7.5	~		î, al	3272			*0, <u>f</u>	3.73	7.41
	177-1	77.3	2:2			Ē-	1922		- "347	-3.7	4. 5.	9.34
	/T.1	 ,		223		. 3.			-213		I.78	8.02
	<u> </u>				, 115					-5, ⁻	-, 23	8.24
				III.	. 113	27					Ē.	0.984

METERIALE AND ARCIES LAS VETALS PRICESS BRAITS VELT SYALLATION LAS

TI BLI TIP, C. I & DOFET WILL

PRE FOSTD STRAIM ANG SASE LEMOTH, INCHES	1.995		MARET TEET1 1 7- ART CTTA UPSA 2195
* CHEM# 17 AS-WE	LDED TENSI	LF DATA	, .
WCRK # SPEC ID WD	THK AFES M	ם מו ז≤. מי גב. בטשטס	LT LLT TE

₩C⊼∺ #	SPEC II	ld Inches	THK INCHES	ares 30. In	MOGULUS MFSI	.2% YD L33	.2⊀ †D kSI	LLT L33	<u>ll</u> t 45]	ĨĒ	TE Y.
97574	T 01	1.003	.317	.316	10.24	12010	37. &	17870	55 . 2	3.17	6.19
97574	T02	1.003	.318	.319	10.45	12193	38. 2	17950	56.3	z . 07	5.69
9757+	T03	1	.318	.319	11.29	12359	3 8.	18050	55.3	2.57	5.38
AVERAGE		1.302	.319	.313	10.56		38. 3		55.4	2.94	5.75
SD. DEV		ø	ē	ø	. 55-+		.538		.292	.324	0.410

03-04-1997 14:07:51

TEST CONDUCTED BY GS

MATERIALS SUD PRICESS LET METALS PRICESS PARTICA WELL EVALUATION LAS

TE SILE 7337 | 1.1 % EFF337 | 1313

LCAD RAM. PRE PO. DAGE LEM SEFVO COM	ST-rD GT 1	STAPIN NOVES		1,5	Ξ	733 26M 5 26M 46.1			τ,) Ξ. υ,	9837 6371 7 - SRT 773 983 195	-	
	* CHE	m #17	SHAU	JED W	ELD TE	MSILE	E DAT	A			2 *	,
	WCFK #	SFEC ID	WD INCHES	THK INCHES	AREA SO. IN	MODULLS MPSI	.2% YD LēS	.2% YD KSI	11.T _83	ULT KSI	TE ×	TE Y.
	97575	T 0 1	1.302	.342	. 343	9. <i>38</i>	11139	32 . 5	17100	49.9	3.27	6.60

1.002 .343 .343 9.28

SD. . I. 0 0 .459

97575 TO2 1.003 .343 .344 8.78 11380 33.1 17220 50.1 4.38 **8.83**

97575 703 1.302 .343 .344 9.66 11660 34 16570 48.2 2.42 **5.08**

33. ≥

.761

49.2 3.36 6.84

1.815 .985 **1.889**

Ø3-Ø4-1997 14:13:54

AVERAGE

TEST CONLUCTED & GS

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 	_	er selve sen se		.0.407
 	<u>-</u>			18-ART
		-	and the second	* ,

) H	ש"ב	* CHEM #18 AS-WELDED TENSILE DATA										
TE Y.	~ .		_ ·	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	-			-23	12			
6.29	- , 	-£,.	=	4 "	***		::	= =	·			
4.87	2.33	<u> 55</u> 2						Die.	···.	701	7351	
5.69		<u> </u>	. 751			-	:	<u>:</u>		*		
5.62	_, =			 -		•	1					
0.713	-23			- 1		<u>,</u>	-					

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* CHEV	ท#18	SHAI	IED W	ELO T	EMSILE	DAT	4		2*	/ **
Ĵ =			 .: 31	 	-11F -13.			 	α. ,	TE Y.
	-7.	••								7.31

,-2-3	723	, i. <u>i</u>		 .EID	.2.2	SIR	73.7	***	8.93
<i></i>									

- IF-IE	. 2.	 ~ ~ ·			-: <u>:</u>	 -	8.49
		 	-	-	~	-:	1.037

MATERIALS AND PROCESS LAS METALS AFFOLESS BALICH WELD EVALUATION, LAS

TENSILE TEST. O.E " OFFSET VIELD

PRE ' GROE L	PAVOS, LO POST-YD ZNOTH, I CONTROL	STRAIN VCHES FILSNA	ME	: 2 . : : : S - ;	935 - DARD	TES SANI PROU WELL MATE	T SARA EL IJI GRAM D PROC ERIAL		F TI I C VI	5357: 1 - AR 778 983 195	Τ	
	¥ CHE WEFK €	W ≠19 SEE 10	AS- WD INCHES	WELDEN THK INCHES	() TEM 53. IN	SILE L MCILLUS MFSI		. 2:f YI K3I	ULT L35	ULT KSI	2" TE	" TE'/.
	975 - 4	TØ1	.999	.315	. 315	10.65	11920	37.8	178÷∂	56.7	2.92	5.48
	97544	TØ2	.977	.315	. 328	11.53	11150	36.2	16080	52. <u>2</u>	2.32	4.37
	97544	T 03	. 997	.313	.312	1 0. 83	11520	37.1	17570	56.3	2.67	5.89

SD. DEV .01215 0 .0035 .525 .794 2.47 .468 0.789

AVERAGE .991 .314 .312 11.Q3 37.1

55.1 2.54 **5.25**

*@2-22-1997*TEST CONDUCTED 3Y GS

MATERIALE AND PROCESS LAS METELS PROCESS BRANCH WELD EVALUATION LAS

TOWSPLE FEET, D. E % DEFEET + SELD

LCAI RANGE, CBS	2-000	FILENAME FOR DIGA	FEI9-
PRE / POSTD STRAIN RMS. 4	2 / 3	TEST PARAMETERS	TEST:
GAGE LENGTH, INCHES	1.95 =	FAMEL I.E.	19-SRT
SERVO CONTROL FILENAME	STANDARD	PROGRAM	CTTP
		WLLI PROCISI	UFFF
		MATERIAL	2195

* CHEM #19 SHAVED WELD TENSILE DATA										າ"	, <u>"</u>	
₩ORK =	SFEC II	WD INCHES	THA INCHES	area SQ. In	MŪŪJLUS MP3I	.e% >D LBS	.E% YD KSI	ULT LES	ULT KSI	ي آ ڏ ۶	TE Y.	
97545	T 0 1	. 999	. 329	. 323	1 0. 31	10510	32 . 1	16050	49	3 . 89	8.43	
97545	732	. 998	. 325	. 324	9.63	10430	32.1	16520	50 . 9	4. 38	9.04	
97545	T03	.999	. 326	. 326	19.74	10560	32.4	16830	49. 3	4. 48	8.73	
AVERAGE		. 999	. 326	.326	10.23		32. <i>2</i>		49.7	4. 25	8.73	
SD. DEV		ð	ð	ø	.558		.21		1. 253	. 324	0.305	

02-22-1997 TEST CONDUCTED BY GS

MATERIALS AND PROCESS LAS METALS FROCESS BRANCH WELD EVALUATION LAS

TE WILE TEST, W.I . OFFSET VIELS

LOPD RANGE, LAS	24033	FILENAME FOR DISK	FEB97
- PRE - POST-YD STEGIN RNG. 1	. <i>2</i>	TEST PARAMETERS	TESTI
GAGE LENGTH, INCHES	1.935	FANEL I.D.	20-ART
SERVO CONTFOL FILEMAME	STANLAFE	PROGRAM	CTTF
		WELD PROCESS	VEFA
		<i>EGTERIAL</i>	2195

* CHEY	n #20	AS-L	VELDEC	J TEN	SILE D	ATH				n'	4 ,16
WORK #	SPEC ID	WD INCHES	THK INCHES	AREA SO. IN	MODULUS MPSI	.2% YD LES	.2% YD KSI	uLT LBS	ULT KSI	2° TE X	下/.
97546	Tð1	. 95S	.315	.302	11.51	1157∂	<i>38.</i> 3	17280	57.3	2.82	5.79
97546	TØ2	. 956	.318	. 304	10.79	10960	36.1	17070	56.1	3.22	6.90
97546	TØ3	.963	. 315	. 303	11. 84	11570	38.2	16960	55. 9	2.72	5.18
AVERAGE		. 959	. 316	. 303	11.11		37.5		56.4	2.92	5.96
SD. DEV		.00359	ð	Ø	. 364		1.265		. 726	.267	0.875

TEST CONDUCTED By GS

MATERIALS GNO PROCESS LAS PETSUS PROCESS BRANCH WELL EVALUATION LAS

TE BOLE TEST, D.C . CRESET FIELD

PRE / POST-YD STRAIN ANG. 'S GAGE LENGTH, INCHES		FILENAME FOR DIEK TEST PARAMETERS FINEL I.D. PROGRAM WELD PROJESS MATERIAL	TEST: 20-SRT CTTE VERE 2195	
* CHEM #20 SHAVE	WELD TEN	ISILE DATA	2"	

*	CHEM	1 #20	SHA	NEO M	ELD 7	Ensile	DAT	TA			າ"	1
	WORN ≢	SPEC ID	₩D INCHE3	THA INCHES	AREA SO. IN	MODULUS XP SI	.2% /D LBS	.2% YD KSI	ULT LBS	ULT KSI	æ ™ ¥	1 1 1/.
	97 5+ 7	T ∂ 1	. 957	. 328	. 314	1 0. 84	10370	<i>3</i> 3	1585)	50.5	4. 33	7.92
	97547	T02	.97	.327	.317	9.37	10600	<i>33.</i> 4	16030	50.5	3.27	7.01
	9 75 47	T@3	.969	. 325	.315	9 . 52	10110	32. 1	15910	50. 5	3 . E8	8.53
	AVERAGE		. 965	. 327	. 315	9.91		32.8		50.5	<i>3.</i> 73	7.82
	SD. CEV		.00725	ð	ø	. 206		.67		0	. 4	0.766

02-22-1997 TEST CONDUCTED BY GS

0

TENSILE TEST, 0.2 % OFFSET YIELD

---F024-003 SLWT/ALTFW FILENAME FOR DISK SEP98
TEST PARAMETERS TEST1 VPPA 2195 PANEL 1.D. WELD PROCESS PROGRAM STANDARD LOAD RANGE, LBS 24000
PRE / POST-YD STRAIN RNG, X 2 / 2
GAGE LENGTH, INCHES 1.985 SERVO CONTROL FILENAME

MATERIAL

*PREWELD TEST PANEL FOR 16RPG+16RPT.
AS-WELDED TENSILE DATA

<u></u> #:/-	6.80	6.80	7.01	1.2.7	7.01	6.96	0.170
<i>"</i> 4 ∺ ×	3.68	3.53	3.63	3.63	3.73	3.64	2720 ¹
ULT KSI	54.3	53.4	53.8	55.6	53.8	54.2	.854
ULT	10850	10670	10680	11120	10600		
.2% YD KSI	35.1	33.6	33.6	34.3	34.2	34.1	999
.2% YD LBS	7010	9209	0299	0989	0749		
MODULUS	9.96	8.43	8.93	67.6	8.74	9.07	.587
AREA SQ.IN	?	.1996	. 1984	۶.	.1972	8 .	0
THK	.201	.201	۲.	.201	.5	.201	0
NO NO INCHES	82	.993	.992	566.	986.	.992	.0037
SPEC ID	RT2	RT4	RT6	RT8	RT10		
# #	981072	981072	981072	981072	981072	AVERAGE	SO. DEV

TEST CONDUCTED BY GS 09-29-1998

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TENSILE TEST, 0.2 % OFFSET YIELD

LOAD RANGE, LBS 24000 FILENAME FOR DISK SEP98
PRE / POST-YD STRAIN RNG, X 2 / 2 TEST PARAMETERS TEST1
GAGE LENGTH, INCHES 1,985 - PANEL I.D. F024-003
SERVO CONTROL FILENAME STANDARD PROGRAM SLWT/ALTFU
MELD PROCESS VPPA
MATERIAL 2195

* PREWELD TEST PANER FOR 16 RPG + 16 RPT SHAVED TENSILE DATA.

H.	8.43	4.64	4.44	4.85	9.75	4.52	0.362
بر آ »	4.58	68.4	76.7	5.04	۴.4	4.85	£571;
ULT ULT	48.7	1.74	48.2	9.87	8.8	7.87	.451
TRS 0LT	0026	9500	9610	9610	9700		
.2% YD KS1	30.9	30.1	30.5	31.5	30.1	30.6	.566
.2% YD LBS	6160	0009	0209	6220	2990		
MODULUS	9.36	8.45	8.22	8.49	8.11	8.53	.493
AREA SQ. IN	.1994	.1992	. 1092	.1976	. 1988	. 1988	0
THK INCHES	.201	.201	.201	۶:	.201	.201	0
WD	-992	.991	.8	.988	.989	8.	0
SPEC 1D	ET.	R13	RT5	R17	R19		
WORK #	981071	981071	981071	981071	981071	AVERAGE	SD. DEV

09-29-1998 TEST CONDUCTED BY GS

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TENSILE TEST, 0.2 % OFFSET YIELD

×	TEST PARAMETERS TEST1 PANEL 1.D. F025-003		WELD PROCESS VPPA	(ATERIAL 2195
	'	TANDARD PRO	NEL	MATI
LOAD RANGE, LBS 24000	GAGE LENGTH, INCHES 1.9	¥ S		

* PREWELD PANEZ FOR 17RP6+17RP7 AS-WELDED TENSILE BATH

世火	11.2	5.89	7.61	7.92	6.09	6.92	0.403
<i>A</i> # ×	3.78	3.27	3.88	4.03	3.32	3.66	, 339
ULT KSI	54.2	52.4	55.4	56.2	53.2	54.3	1.538
ULT	10900	10600	11150	11320	10740		
.2% YD KSI	35.3	35.1	35.2	35.4	35.6	35.3	.202
.2% YD LBS	7100	7100	7090	7130	7190		
MODULUS MPS1	10.51	10.51	10.63	9.3	10.12	10.21	.543
AREA SQ. IN	.201	.202	.201	.201	.202	.202	0
THK INCHES	.202	.202	.202	.202	.202	.202	0
NCHES	%6.	1.001	266.	266.	% :	866.	0
SPEC 10	R12	814	R16	R18	RT10		
WORK #	981070	981070	981070	981070	981070	AVERAGE	SO. DEV

09-29-1998 TEST CONDUCTED BY GS

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TENSILE TEST, 0.2 % OFFSET YIELD

SLWT/ALTFW F025-003 TEST1 SEP98 VPPA 2195 FILENAME FOR DISK TEST PARAMETERS ---PANEL 1.D. -- --WELD PROCESS PROGRAM STANDARD LOAD RANGE, LBS 24000
PRE / POST-YD STRAIN RNG, X 2 / 2
GAGE LENGTH, INCHES 1.985 SERVO CONTROL FILENAME

MATERIAL

* PREWEID TEST PHINEL FOR 17RPG+17RPT SHAVED WEIG TENSILE DATA.

1.51	8.83	4.54	4.24	9.95	4.02	0.934
3.68	4.74	76.7	4.74	68.7	4.59	754
47.8	47.7	48.8	8.8	48.3	48.3	.554
9620	9590	9820	9830	9790		
31.2	33.2	31.6	31.8	30.7	31.7	826
9280	0299	6360	6410	6220		
9.15	7.7	9.61	9.53	8.88	8.98	.756
.201	.201	.201	.202	.203	.202	0
.202	.202	.202	.202	. 203	.202	0
766.	966.	.995	866.	8%.	.87	0
RT1	RT3	RTS	R17	RT9		•
981069	981069	981069	981069	981069	AVERAGE	SO. DEV
	RT1 .997 .202 .201 9.15 6280 31.2 9620 47.8 3.68	RT1 .997 .202 .201 9.15 6280 31.2 9620 47.8 3.68 RT3 .996 .202 .201 7.74 6670 33.2 9590 47.7 4.74	RT1 .997 .202 .201 9.15 6280 31.2 9620 47.8 3.68 RT3 .996 .202 .201 7.74 6670 33.2 9590 47.7 4.74 RT5 .995 .202 .201 9.61 6360 31.6 9820 48.8 4.94	RT1 .997 .202 .201 9.15 6280 31.2 9620 47.8 3.68 RT3 .996 .202 .201 7.74 6670 33.2 9590 47.7 4.74 RT5 .995 .202 .201 9.61 6360 31.6 9820 48.8 4.94 RT7 .998 .202 .202 9.53 6410 31.8 9830 48.8 4.74	RT1 .997 .202 .201 9.15 6280 31.2 9620 47.7 3.68 RT3 .996 .202 .201 7.74 6670 33.2 9590 47.7 4.74 RT5 .995 .202 .201 9.61 6360 31.6 9820 48.8 4.94 RT7 .998 .202 .202 9.53 6410 31.8 9830 48.8 4.74 RT9 .998 .203 .203 8.88 6220 30.7 9790 48.3 4.89	RT1 .997 .202 .201 9.15 6280 31.2 9620 47.7 4.74 RT3 .996 .202 .201 7.74 6670 33.2 9590 47.7 4.74 RT5 .995 .202 .201 9.61 6360 31.6 9820 48.8 4.94 RT7 .998 .202 .202 9.53 6410 31.8 9830 48.8 4.74 RT9 .998 .203 .203 8.88 6220 30.7 9790 48.3 4.89 .997 .202 .202 8.98 31.7 9790 48.3 4.89

TEST CONDUCTED BY GS 09-28-1998

TENSILE TEST, 0.2 % OFFSET YIELD

PREWELDED TEST PHALL FOR 18RP6+18RP71 HSWELDED TETISILE OATH	<u></u>	6.50	09.9	6.50	5.89	5.58	6.21	0.451
PAPL It ISIL	<i>2</i> 4	3.43	2.92	3.12	3.07	2.87	3.08	.218
D TEST	ULT KSI	52.7	51.1	52.4	52.6	50.4	51.8	1.013
EWEU	ULT	10310	10040	10240	10260	0266		
* I	.2% YD KSI	33.1	32.6	33.5	32.9	33.2	33.1	.341
	.2% YD LBS	6470	6410	9229	6420	6550		
OCT98 TEST1 F027-002 SLWT/ALTFW VPPA 2195	MODULUS MPSI	9.31	9.58	10.01	9.92	9.03	9.57	17.
	AREA SQ.IN	. 1958	.1965	.1854	.1%	.1976	<u>\$</u>	0
FILENAME FOR DISK TEST PARAMETERS PANEL I.D. PROGRAM WELD PROCESS	THK	.201	.202	.201	.201	.202	.201	0
S S	UD INCHES	.974	576.	.972	76.	876.	56.	0
24000 , x 2 / 2 1.985 STANDARD	SPEC 1D	RT2	R14	R16	R18	RT10		
LOAD RANGE, LBS 24000 PRE / POST-YD STRAIN RNG, % 2 / 2 GAGE LENGTH, INCHES 1.985 SERVO CONTROL FILENAME STANDA	WORK #	981111	981111	981111	981111	981111	AVERAGF	SO. DEV

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TENSILE TEST, 0.2 % OFFSET YIELD

18RP6+18KP7								
	<u></u> fi_/.	9.75	9.75	8.73	10.05	45.00	4.32	0.747
PREWELD TEST PANEZ FOR SHAVED TEVISILE DATA.	<i>'</i> α	5.19	78.7	4.23	5.14	4.28	72.7	.458
EST P	ULT KSI	48.4	47.6	47.1	48.2	9.97	47.6	.748
FLD 74	ULT	9500	9360	9240	09%6	9140		
* Peew SHA	.2% YD KSI	29.5	29.1	28.8	29.5	28.9	29.5	.317
1	.2% YD LBS	2800	5720	2660	5780	2660		
0CT98 TEST1 F027-002 SLUT/ALTFW VPPA 2195	MODULUS	8.95	9.16	8.97	8.57	8.58	8.85	.259
×	AREA SQ. IN	.1963	.1966	. 1962	.1964	.1962	. 1963	0
FILENAME FOR DISK TEST PARAMETERS PANEL I.D. PROGRAM WELD PROCESS	THK	.202	.201	.201	.201	.201	.201	0
8	NO INCHES	246.	876.	976	716.	976.	976	0
24000 1, % 2 / 2 1.985 STANDARD	SPEC 10	RT1	RT3	RT5	R17	R19		
LOAD RANGE, LBS 24000 PRE / POST-YD STRAIN RNG, % 2 / 2 GAGE LENGTH, INCHES 1.985 SERVO CONTROL FILENAME STAND/	WORK #	981110	981110	981110	981110	981110	AVERAGE	SD. DEV

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APPENDIX I REPAIR WELD TENSILE DATA

PART II FILLER WIRE DEVELOPMENT PROGRAM

0.2001 2195PLATE/2195PLATE VPPA WELD FUSION LINE REPAIR WELD TENSILE TEST DATA

WELD TENSILE	FRACTURE PATH	Repair Weld ~45 degrees	VPPAW Root Toe-Repair Weld Cover Toe ~45 degrees	VPPAW Root Toe-VPPAW/Repair Toe ~60 degrees	VPPAW Root F/line-Repair Weld Cover Toe ~45 degrees		Opposite F/line	Opposite F/line	Opposite F/line	Opposite F/line		VPPAW Root Filine-VPPAW Cover Center	VPPAW Root Filine-VPPAW Cover Center	Repair Weld Filine-VPPAW Cover Center ~45 degrees	VPPAW Root Toe-VPPAW Cover Center ~45 degrees		Repair weld where post planish crack	Repair Weld/Parent Matt F/line	Repair Weld	Repair Weld/VPPA Filine		VPPAW Root Toe-VPPAW Cover Center ~45 degrees	VPPAW Cover Center-Repair Weld Cover Center ~45 degrees	VPPAW Root Toe-VPPAW Cover Center ~45 degrees	VPPAW Root Toe-VPPAW Cover Center ~45 degrees		VPPA Weld	Repair Weld/Parent Matl F/line	Opposite F/line	VPPA Weld	
ACTUAL	R-LEVEL	22	R.	85 85	\$ <u>2</u>		22	22	83	82	× 47	R6	8	22	82	•	88	88	82	RS		22	82 83	82	RS	įs .;	RS	82	8. 8.	R5	,
UTLIMATE	STD DEV					3 62	F				7 33					222					386					1 99	E				2.26
KELONG	(2 0 IN GAGE)	217	287	116	3 53	2 43	2.20	62	120	1 30	2 23	222	2 52	191	277	2 36	2.20	1 70	1 70	2 80	2 10	2 8 2	4 94	217	3 02	3 24	23	31	29	26	273
MELONG	(1 0 IN GAGE)	4 08	538	254	6.60	4 65	4 70	9 10	2 40	2 50	4 68	4 26	477	3 55	4 67	4 31	4 40	350	3 40	5.50	4 20	5 18	9.75	437	5.89	6 30	43	9	83	56	5 68
ULTIMATE	(KSI)	40 30	45 10	37 40	44 40	41 80	56 30	63 70	49 00	47 90	54 23	43 00	45 80	44 70	48 30	45 45	53 10	55 10	53 20	61 30	55 68	42.5	468	42.7	443	44 08	544	29.9	57.7	57.2	57 30
YIELD	(KSI)	35 60	36 80	8	35 70	36 03	47 30	49 10	45 30	45 30	46 75	34 80	32 50	39 60	39 70	36 65	44 00	46 40	5130	49 30	47 75	33.6	385	35.1	383	35 88	45.2	47.6	5	46 1	45.98
TEST	TEMP	RT	R	R	RT		LN2	LN2	LN2	LN2		RT	RT	ᅜ	ᅜ		LN2	LN2	ĽN2	LN2		RT	R	R	RT	; ; ;	CN2	LN2	CN2	LN2	
REPAIR WELD	SPECIMEN#	SRT01	SRT02	SRT01	SRT02	57.	SCTO1	SCT02	SCT01	SCT02		SRT01	SRT02	SRT01	SRT02	C K	SCT01	SCT02	SCT01	SCT02		SRT01	SRT02	SRT01	SRT02		SCT01	SCT02	SCT01	SCT02	
TEST	PANELS	16RP6	16RP6	16RP7	16RP7		16RP6	16RP6	16RP7	16RP7		17RP6	17RP6	17RP7	17RP7		17RP6	17RP6	17RP7	17RP7		18RP6	18RP6	18RP7	18RP7		18RP6	18RP6	18RP7	18RP7	
REPAIR	CONDITION	PLAN RS	REPAIR								•	PLAN RS	REPAIR			×						PLAN RS	REPAIR	***	; I #2						
FILLER	CHEM		#16		60 Cu	04 Ag	04 Zn	0 25 Ti	0 25 Zr				714			9 Cu	0 4 Ag	0.4 Mg	0 25 TI	0 25 Zr			## 8				DO 09	0.4 Ag	0 25 Ti	0 25 Zr	

PART II FILLER WIRE DEVELOPMENT PROGRAM

0.2001 2195PLATE/2195PLATE VPPA WELD FUSION LINE REPAIR WELD TENSILE TEST DATA

FILLER	REPAIR	TEST	REPAIR WELD	7507	VIELD	111 7134475	%ELONG	%ELONG	UTLIMATE
CHEM	CONDITION	TEST PANELS	SPECIMEN#	TEST	YIELD (KSI)	ULTIMATE (KSI)	(1 0 IN GAGE)	(2 0 IN GAGE)	STD DEV
	R5	16-R01	ART01	RT	25 90	39 70	8 12	4 13	
	REPAIR	16-R02	ART02	RT	26 90	38 70	660	3 27	
	KEFAIK	16-R03	ART03	RT	26 40	39 90	690	3 27	
		16-R04	ART04	RT	26 10	40 40	6 40	3 43	
		10-10-4	ARTOS	N.	26 33	39 68	7 01	3 53	0 71
		16-R01	ACT01	LN2	36 00	56 50	7 70	3 70	
#19 INITIAL WELD		16-R02	ACT02	LN2	38 00	54 50	630	300	
#16 REPAIR		16-R02	ACT03	LN2	37 40	50 70	660	260	
#10 KEPAIK		16-R03	ACT04	LN2	37 40 36 60	50 70 51 10	5 40	270	
		10-104	AC104		37 00	53 20	6 50	3 00	2 78
	PLAN R5	16-RP1	ART01	D.T.		40 40	477	2 62	273
				RT	32 50	1	508	2 27	
	REPAIRS	16-RP2	ART02	RT	30 60	39 60	· ·	267	
		16-RP3	ART03	RT	32 60	42 10	5 38		
		16-RP4	ART04	RT	34 00	42 50	4 37	212	4.00
		40.004			32 43	41 15	4 90	2 42	1 39
		16-RP1	ACT01	LN2	44 80	54 00	5 00	230	
		16-RP2	ACT02	LN2	42 70	55 60	6 30	3 10	
		16-RP3	ACT03	LN2	42 40	57 60	7 50	3 70	
		16-RP4	ACT04	LN2	43 00	53 10	610	2 40	4.00
					43 23	55 08	6 23	2 88	1 98
	R5	17-R01	ART01	RT	28 6	40 4	65	3 38	
	REPAIR	17-R02	ART02	RT	29 9	41 6	64	3 27	
		17-R03	ART03	RT	30 9	44 8	5 99	3 12	
	,	17-R04	ART04	RT	31	44 4	65	3 32	
					30 10	42 80	6 35	3 27	2.14
		17-R01	ACT01	LN2	44 8	49 3	35	14	
#20 INITIAL WELD		17-R02	ACT02	LN2	47 9	61 8	45	27	
#17 REPAIR		17-R03	ACT03	LN2	45 8	64 6	74	33	
· · · · · · · · · · · · · · · · · · ·		17-R04	ACT04	LN2	43 9	58 1	51	25	
					45 60	58 45	5 13	2 48	6.66
```	PLAN R5	17-RP1	ART01	RT	36 5	43 4	3 15	1 46	
	REPAIRS	17-RP2	ART02	RT	38	44 5	4 16	1 88	
		17-RP3	ART03	RT	38 3	46 2	3 45	1 46	
		17-RP4	ART04	RT	36 5	45 1	4 67	2 12	
					37 33	44 80	3 86	1 73	1 17
		17-RP1	ACT01	LN2	46 6	63 9	7	31	
****		17-RP2	ACT02	LN2	51 1	59 5	47	22	
		17-RP3	ACT03	LN2	55 4	63 3	29	12	
		17-RP4	ACT04	LN2	51 3	60 2	43	22	
				2000	51 10	61 73	4 73	2 18	2 20
	R5	18-R01	ART01	RT	27	42	8 22	4 28	
	REPAIR	18-R02	ART02	RT	28	40	7 92	4 03	
		18-R03	ART03	RT	28 7	42 4	8 63	4 53	
``\		18-R04	ART04	RT	30 4	38 4	4 06	2 02	
					28 53	40 70	7 21	3 72	1 86
		18-R01	ACT01	LN2	38 5	59 2	59	35	
#16 INITIAL WELD		18-R02	ACT02	LN2	39 4	56 8	74	43	
#18 REPAIR		18-R03	ACT03	LN2	39 8	58	6	3	
		18-R04	ACT04	LN2	39 2	52 3	52	18	
					39 23	56 58	6 13	3 15	3 01
	PLAN R5	18-RP1	ART01	RT	37 5	468	6 19	3 22	
	REPAIRS	18-RP2	ART02	RT	38 6	47 1	4 67	2.52	
		18-RP3	ART03	RT	39 2	47	4 67	2 42	
		18-RP4	ART04	RT	39 9	48	4 06	2 12	
					38 80	47 23	4 90	2 57	0 53
		18-RP1	ACT01	LN2	42 6	59 1	81	45	
				اصدا	44 3	59 5	73	38	
		18-RP2	ACT02	LN2	77.5	1 223	, , ,	1 30	
		18-RP2 18-RP3	ACT02 ACT03	LN2	46 4	55 9	42	25	
		1					l .	1	

# PART II FILLER WIRE DEVELOPMENT PROGRAM WELD TENSILE FRACTURE LOCATION

<u>O</u>	SHAVED	MATERIAL	TEMP	FRACTURE LOCATION
16RP6-SRT01	SHAVED	2195P/2195P	RT	45 DEGREES THRU REPAIR ZONE
16RP6-SRT02	SHAVED	2195P/2195P	RT	45 DEGREES THRU VPPA FUSION ZONE
16RP7-SRT01	SHAVED	2195P/2195P	RT	VPPA FUSION ZONE AND LINE
16RP7-SRT02	SHAVED	2195P/2195P	RT	45 DEGREES THRU VPPA FUSION ZONE TO VPPA FUSION LINE OPPOSITE REPAIR WELD
16RP6-SCT01	SHAVED	2195P/2195P	-320	VPPA FUSION LINE OPPOSITE REPAIR WELD
16RP6-SCT02	SHAVED	2195P/2195P	-320	VPPA FUSION ZONE
16RP7-SCT01	SHAVED	2195P/2195P	-320	VPPA FUSION LINE OPPOSITE REPAIR WELD
16RP7-SCT02	SHAVED	2195P/2195P	-320	VPPA FUSION LINE OPPOSITE REPAIR WELD
17RP6-SRT01	SHAVED	2195P/2195P	RT	45 DEGREES THRU VPPA FUSION ZONE TO VPPA FUSION LINE OPPOSITE REPAIR WELD
17RP6-SRT02	SHAVED	2195P/2195P	RT	45 DEGREES THRU VPPA FUSION ZONE TO VPPA FUSION LINE OPPOSITE REPAIR WELD
17RP7-SRT01	SHAVED	2195P/2195P	RT	45 DEGREES REPAIR-PLATE FUSION LINE TO VPPA FUSION ZONE
17RP7-SRT02	SHAVED	2195P/2195P	RT	45 DEGREES THRU VPPA FUSION ZONE
17RP6-SCT01	SHAVED	2195P/2195P	-320	REPAIR ZONE
17RP6-SCT02	SHAVED	2195P/2195P	-320	REPAIR-PLATE FUSION LINE TO REPAIR ZONE
17RP7-SCT01	SHAVED	2195P/2195P	-320	REPAIR-PLATE FUSION LINE TO REPAIR ZONE
17RP7-SCT02	SHAVED	2195P/2195P	-320	VPPA FUSION ZONE TO REPAIR ZONE
18RP6-SRT01	SHAVED	2195P/2195P	RT	45 DEGREES THRU VPPA FUSION ZONE
18RP6-SRT02	SHAVED	2195P/2195P	RT	45 DEGREES VPPA FUSION ZONE TO REPAIR ZONE
18RP7-SRT01	SHAVED	2195P/2195P	RT	45 DEGREES VPPA FUSION ZONE TO VPPA FUSION LINE OPPOSITE REPAIR
18RP7-SRT02	SHAVED	2195P/2195P	RT	46 DEGREES VPPA FUSION ZONE TO VPPA FUSION LINE OPPOSITE REPAIR
18RP6-SCT01	SHAVED	2195P/2195P	-320	VPPA FUSION LINE
18RP6-SCT02	SHAVED	2195P/2195P	-320	REPAIR-PALTE FUSION LINE TO REPAIR ZONE
18RP7-SCT01	SHAVED	2195P/2195P	-320	VPPA FUSION ZONE
18RP7-SCT02	SHAVED	2195P/2195P	-320	VPPA FUSION ZONE

PART II FILLER WIRE DEVELOPMENT PROGRAM REPAIR WELD CRYO TENSILE DATA

Fracture	Location		WELD ZONE	FUSION LINE	FUSION LINE	FUSION LINE	FUSION LINE	WELD ZONE	WELD ZONE	WELD ZONE	FUSION LINE	FUSION LINE	WELD ZONE	WELD ZONE	WELD ZONE	FUSION LINE	WELD ZONE	WELD ZONE	FUSION LINE	FUSION LINE	WELD ZONE	WELD ZONE	WELD ZONE	WELD ZONE	FUSION LINE	FUSION LINE	FUSION LINE	WELD ZONE	FUSION LINE	FUSION LINE	WELD ZONE	FUSION LINE	FUSION LINE	WELD ZONE	WELD ZONE	FUSION LINE	WELD ZONE	WELD ZONE
*	펍	%	35	43	30	18	45	38	25	41	23	31	3.7	2.4	3.7	30	26	2.7	1 4	2.7	33	25	3.1	22	12	22	2.2	42	12	13	20	11	11	28	23	31	29	26
+	딥	፠	29	74	60	52	8 1	73	42	7 9	50	63	7.5	61	77	63	99	54	35	45	7.4	51	7.0	47	29	43	47	91	24	25	44	35	3.4	55	43	9	63	26
ELASTIC	MODULU	Msı	125	123	121	107	106	103	122	121	138	109	102	111	126	122	131	118	114	140	12.5	13.4	9.2	115	115	125	83	115	139	106	88	83	106	102	7.2	100	139	180
	UTS	ţSi	59.2	268	580	523	59.1	595	529	618	540	556	976	53 1	265	545	202	511	493	618	646	581	639	595	633	60 2	90899	63739	48982	47891	53131	55103	53197	61269	54354	60455	57739	57216
%	ΥS	ksı	385	39.4	39.8	39.2	426	443	464	466	448	42.7	424	430	380	880	37.4	386	448	47.9	458	439	466	511	55.4	513	47297	49099	45282	45273	43963	46377	51289	49310	45460	48030	45000	46145
INITIAL	AREA	ın^2	0 2035	0 2032	0 2016	0 2074	0 2044	0 2054	0 2052	0 2014	0 1988	0 1954	0 1946	0 2034	0 1952	0 1944	0 1976	0 1932	0 1859	0 1738	0 1958	0 1946	0 1894	0 1950	0 1864	0 1966	0 1998	0 1998	0 1986	0 1978	0 1996	0 1994	0 2002	0 2032	0 1998	0 1980	0 1990	0 1978
ULTIMAT	S S	<u>8</u>	12,054	11,535	11,685	10,838	12,075	12,218	11,475	12,443	10,733	10,860	11,213	10,808	11,025	10,605	10,013	9,878	9,173	10,748	12,645	11,303	12,105	11,595	11,798	11,835	11,250	12,735	9,728	9,473	10,605	10,988	10,650	12,450	10,860	11,970	11,490	11,318
%	۲۲	ş	7,836	8,010	8,033	8,138	8,700	960'6	9,525	9,383	8,903	8,348	8,250	8,753	7,035	7,388	7,395	7,073	8,325	8,325	8,963	8,550	8,820	9,975	10,335	10,095	9,450	9,810	8,993	8,955	8,775	9,248	10,268	10,020	9,083	9,510	8,955	9,128
THCK.	NITAL	E	0 204	0 203	0 202	0 207	0 205	9020	0 205	0 202	0 199	0 196	0 195	0 204	0 196	0 195	0 198	0 194	0 187	0 175	0 197	961 0	0610	0 196	0 187	0 197	0 200	0 200	0 199	0 198	0 200	0000	0 200	0 203	0200	0 200	0 199	0 198
WIDTH	MITA	5	966 0	1001	0 998	1 002	0 997	0 997	1001	2660	6660	266 0	0 998	0 997	9660	0 997	966 0	966 0	0 994	0 993	0 994	0 993	0 997	0 995	0 997	0 998	666 0	0 889	0 988	666 0	966 0	2660	1001	1001	666 0	0860	1 000	666 0
_	FINAL	<u>-</u>	2 080	2 096	2 0 7 2	2 049	2 102	2 086	2 060	2 093	2 054	2 068	2 0 7 9	2 056	2 084	2 066	2 061	2 066	2 041	2 064	2 077	2 061	2 074	2 055	2 037	2 054	2 052	2 092	2 031	2 032	2 047	2 040	2 040	2 061	2 0 5 2	2 071	2 066	2 059
2" Gage	INITIAL	-	-	-	Н	-	-	-	-	$\vdash$	-	Н	-	Η	Η	⊢	2 009	Н	2012	Н		2011	Н	Н	2012	Н	Н	Н	2 007	Н	Н	2005	$\vdash$	-	-	Н	2 007	Н
	FINAL	Ξ	1 077	1 087	1 077	1 067	1 099	1 087	1 054	1 092	1 065	1 078	1 087	1 067	1 088	1067	1069	1 068	1 047	1 055	1 088	1 063	1 084	1 062	1 043	1054	1 056	1096	1 032	1 032	1 049	1 041	1 041	1 060	1 050	1 067	1 069	1 063
1" Gage	INITIAL	Ē	1 017	1 012	1 016	1 014	1 017	1 013	1 012	1 012	1 014	1014	1011	1 006	1 010	98	1 003	1 013	1 012	1 010	1 013	1 011	1 013	_		-	1 009	1005	1 008	1 007	1 005	98	1 007	1 005	1 007	1 007	1 006	1 007
ш	Н	TIME	5 MIN	5 MIN	5 MIN	5 MIN	5 MIN	5 MIN	5 MIN	S MIN	5 MIN	Н	5 MIN	2 MIN	2 MIN	SMIN	5 MIN	S MIN	5 MIN	2 MIN	2 MIN	NIMS	2 MIN	5 MIN	2 MIN	5 MIN	5 MIN	5 MIN	Н	П	5 MIN	Н	5 MIN	5 MIN	5 Mil	H	Н	2 MIN
TEST PARAMET	MEDIA		LN2           LN2	LN2	LN2	LN2	LN2	LN2	LN2	LN2	LN2	rN2	LN2																									
	MATERIAL		2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	H	2195P/2195P	2195P/2195P	Н	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	Н	Н	Н	Н	Н	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	2195P/2195P	Н	Н	2195P/2195P
	TEST	TYPE	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED	SHAVED
	OTHER	ON CI	18-R01-ACT01	18-R02-ACT02	18-R03-ACT03	18-R04-ACT04	18-RP1-ACT01	18-RP2-ACT02	18-RP3-ACT03	18-RP4-ACT04	16-RP1-ACT01	16-RP2-ACT02	16-RP3-ACT03	16-RP4-ACT04	16-R01-ACT01	16-R02-ACT02	16-R03-ACT03	16-R04-ACT04	17-R01-ACT01	17-R02-ACT02	17-R03-ACT03	17-R04-ACT04	17-RP1-ACT01	17-RP2-ACT02	17-PR3-ACT03	17-RP4-ACT04	16RP6-SCT01	16RP6-SCT02	16RP7-SCT01	16RP7-SCT02	17RP6-SCT01	17RP6-SCT02	17RP7-SCT01	17RP7-SCT02	18RP6-SCT01	18RP6-SCT02	18RP7-SCT01	18RP7-SCT02
	MRFT	ON Q	16,229	16,230	16,231	16,232	16,233	16,234	16,235	16,236	16,237	16,238	16,239	16,240	16,241	16,242	16,243	16,244	16,245	16,246	16,247	16,248	16,249	16,250	16,251	16,252	17,614	17,613	17,621	17,615	17,623	17,622	17,617	17,618	17,620	17,619	17,616	17,612

### TENSILE TEST, 0.2 % OFFSET YIELD

LOAD RANGE, LBS		24000	FILENAME FOR DISK	JUL97
PRE / POST-YD STRAIN RNG,	%	2/2	TEST PARAMETERS	TEST1
GAGE LENGTH, INCHES		1.985	PANEL I.D.	16
SERVO CONTROL FILENAME		STANDARD	PROGRAM	SLWT
•			WELD PROCESS	VPPA/GTAW_
			MATERIAL	2195 dis

		•	•	أبال			1		342	. 1
WORK #	SPEC ID	WD INCHES	THK INCHES	AREA 50. IN	KJDULUS MPSI	.2K YD LBS	.2%`YD` KSI	ULT ULT	TE .	TE
97746	RØ1	, 1. <i>0</i> 05	.202	.203		<b>5250</b>	<i>2</i> 5. 9	B060 39.7	4.13	8.1Z
97746	R02	1.007	.201	282	8.32	5440	26.9	<b>7849 38.</b> 7	3.27	6.60
97746	R03	1.607	.201	. 202	9.51	5340	26.4	8070 39.9	3.27	6.90
97746	R04	1.004	.201	. 282	9. 96	5270	26.1	8160 48.4	3.43	6.40
AVERAGE		1.006	.201	.202	9. <i>26</i>		26.3	39.7	3.53	7.01
SD. DEV		8	ø	8	.696		. 427	. 703	.409	0.773

07-22-1997 TEST CONDUCTED BY GS

### TENSILE TEST, 0.2 % OFFSET YIELD

LOAD RANGE, LBS	24000	FILENAME FOR	DISK	JUN97	'
PRE / POST-YD STRAIN RNG, .	% 2/2	TEST PARAMET		TEST1	
GAGE LENGTH, INCHES	1.985	PANEL I.D.	16RP	-F003;004;0	<del>25 ; 006 -</del>
SERVO CONTROL FILENAME	STANDARD	PROGRAM		ALT FILLER	WIRE
· .	the second second	WELD PROCESS	7.5	VPPA	
not be a second		MOTERIOI '	1 1 2 2	2105	

two.		, et	×.,	4 2 1 1 d		a.a. 100	عيده وكالمواجع المحاورة	- 1121	43. <u>2</u> 5.		
MORK #	SPEC	ID "HD	THK	AREA	Modulus	.2x YD	2% YD	, JULT	. , `ULT ,		
\$ *** **	, 1	INCHES	INCHES	, <b>50.</b> IN	MPSI	LBS	KSI	LBS	KSI		
,	، بند					Ì., "	· 安克克·		1. 6. 6. 6.	BELLEVIE BE	
4, 44		4.471			· ·		A STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STA				
16RP1 97722	` ***	FOOD	ACCOUNT OF THE PARTY OF		A 32	1500	ALL WAS	A. 6. 1 4 4	J-2 / Fig. 4	1	7
INCLI ALICE	<i>3</i> -01	1.009	201	. <b>CB</b> S	<b>".9. 3</b> 6	6590		8266	40.4	2.02	,
y Byster as	• • •					;	Marie Control				
16RP2 97722	<i>K</i> -82	*1.012		<b>282</b>	9.94	6190	30.6	8929	39.6	2.27 <b>5.08</b>	
			1.5	<b>新疆的</b> (1)	134		4 Jan * 2 g	- Weider	د د د د د د د د د د د د د د د د د د د		
16RP3 97722	<b>%-0</b> 3	1.009	£. 3, 13	120 yr 5000	10.2	6580	32.6	8500	15 1	2.67 5.38	
(OP) STILL	μ-υ3	1.007	. • •	EUC.	. 10.E	0306	35.0	0000	42.1		
			- 1 70	活點。"。	•			•	•		
16RP4 97722	ø- <b>0</b> 4	1.009	. 201	203	10.1	6890	34	8628	42.5	2.12 4.37	
• • •				*****					•		
										(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	
AHEBACE			•	000	, ,		<b>30</b> (		14.6	Lan	
average		1.61	.2	. 202	9.9		32.4		41.2	2.42 TIO	
											L
SD. DEV		. 0	0	0	.375		1.409		1.373	.27 0.43	T

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### TENSILE TEST, Ø.2 % OFFSET YIELD

LOAD RANGE, LBS PRE / POST-YD STRAIN RNG, %	24000 2 / 2	FILENAME FOR DISK' TEST PARAMETERS	JUL97 TEST1
GAGE LENGTH, INCHES	1.985	PANEL I.D.	17
SERVO CONTROL FILENAME	STANDARD		SLWT VPPA/GTAW
·	200	WELD PROCESS	VEFHIDIAW

					٠,٠,٠			·		يونونونونونونونونونونونونونونونونونونون	窓際と	23.75
HORK #	SPEC	ID (	D	· THK	AREA	MODULUS	.2≭ YD	.ex yd	ULT	ULT []	TIE	TE .
	٠.	· IM	HES	INCHES	SQ. IN	<b>IPSI</b>	LBS	KSI	LBS	KSI		771
	٠,	THE STATE OF		al dirite attle at Life			1		,	e the		
			***				,	, , ,				
97747	, RØ1		<b>907</b>	. 201	202	9.7	5800	28.6	8180	40.4	3/38	6.50
۶.						3 30 34 4		* * * * * * * * * * * * * * * * * * *	•			
97747	R02	1.	<b>30</b> 9 []	.2	202	10	6040	29.9	<i>83</i> 9 <i>0</i>	41.6	1.27	<i>6</i> :40
				門那	<b>网络加克克斯</b>		#	-				TATE OF THE PARTY.
97747	R03	1.	309 ¨	. 201		10.28	6260	30.9	9080 🦷	44.8	3.12	5.99
		, 32, c	, -= ;	,		NAME OF T	•	•	, , , , ,			
97747	RØ4	1.0	<i>105</i>	. 202	. 203	10.37	6290	31	9010	44, 4	3.32	6.5c
				3		51			- <u>-</u> - [	ないまない。 は、はありも		
					•	1			, 12	4		7. 25
AVERAGE		1.0	808	.201	. <i>2</i> 03	10.09		30.1	1 بيرشم	42.8	<i>3.27</i>	<b>6.</b> 3=
									,	10	, 3: " -	學送
SD. DEV		8		0	8	. 304		1.09		2.13	. 1088	0.24

W7-22-1997 TEST CONDUCTED BY GS

### TENSILE TEST, Q.2 % OFFSET YIELD

FILENAME FOR DISK MAY97

PRE / POST-YD STRAIN GAGE LENGTH, INCHES SERVO CONTROL FILENA	ŕ	% 2 / 2 1.985 STANDARD	TEST PARAMETERS PANEL I.D. PROGRAM WELD PROCESS	
			MATERIAL	2195
MORK # SPEC ID	ND INCHES	THK AREA SQ. IN	MODULUS .2x YD .2x YD MPSI LBS KSI	LIS KSI 15 /.
97664 1-01	. 997	.201 .2	9.6 7320 36.5	8786 43.4 1.361 33.15
97664 2-82	. 996	.199 .1982	9. 85 <i>7</i> 540 38	8820 44.5 1.864 7.4.16

24000

Ø5-Ø8-1997

LOAD RANGE, LBS

AVERAGE

SD. DEV

### TENSILE TEST, 0.2 % OFFSET YIELD

LOAD RANGE, LBS		24000	FILENAME FOR DIS	5K • <b>JU</b> Ĺ97
FRE / POST-YD STRAIN RNG,	%	2/2	TEST PARAMETERS	TEST1
GAGE LENGTH, INCHES		1.985	PANEL I.D.	ïä
SERVO CONTROL FILENAME		STANDARD	<b>PROGRAM</b>	SLWT
•			WELD PROCESS	VPPA/GTAW
<b>*</b> ***			MATERIAL	2195

	20ca **			4050	و کُورِ کِی ا		0		<u>_</u>
WORK #	SPEC ID	ND Inches	THK INCHES	AREA SQ. IN	MODULUS Mpsi	.2¥ YD ‰£BS	. 2% 'YD KSI	ULI ULI TE	=
		INUES	INCHES	38- IN	MP31	- 624 <b>F.D3</b>	vat .	WEBS AND THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE	
<b>-</b>	,	, .		, i	10. 10. 10. 10. 10. 10. 10. 10. 10. 10.		,		
97748	R01	1.006	. 202	.203	10.41	5490	27	8538 42 4.28 <b>8.</b> 2	12
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,	-, -, -,		\$ 15° 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	建			_
^{?)} 97748	R <b>0</b> 2	1.008	. 201	203	9. 98	5688	28	8270 40.8 4.03 7.9	2
	,	, , ,	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	17 FF 13 TH					_
[*] 97748	R03	1:004	. 201	.202	10.28	5790	28.7	8568 42.4 4.53 8.6	.3
' • •		· r	-	· - `,·		المَّامِّةُ وَدُّ	, m. 4 ,		, <u>,</u> ,
97748	R <b>0</b> 4	1.006	. 201	.202	10. 14	6140	<i>30.</i> 4	7768 38.4 2.02 4.0	ما
						`			
AUCDACE		1 001	201	222	10.0		20.5	7.7	. 1
HYERHOC		1.000	. 201	. 202	10.2		28.3	AB	- 1
SD. DEV		a	a	A	1858		1. 413	1.82 1.152 2 11	8
AVERAGE SD. DEV		1.006 0	. 201 0	.202 0	10.2		28.5 1.413	48.9 3.72 7.2 1.82 1.152 2.11	٤.

*07-23-1997 10:23:38* 

### TENSILE TEST, O.E % OFFSET YIELD

LOAD RANGE, LBS	24000	FILENGME FOR DISK	MAY97
PRE / POST-YD STRAIN RNG, %	2/3	TEST FARAMETERS	TEST1
GAGE L <b>ENG</b> TH, INCHES	1.985	PANEL I.D.	18-RP
SERVO CONTROL FILENAME	STANDARD	PROGRAM	CTTP
		WELD PROCESS	VPPA
		<i>MATERIAL</i>	2195

HORK #	SPEC ID	WD INCHES	THK INCHES	AREA SQ. IN	MODULUS MPSI	.2≭ YD LBS	.2% YD	ULT KSI	2 T	E /
					,		To the	37 2		•
<b>976</b> 67	1-01	1.025	. 201	. 206	9. 54	7730	37.5 9640	46.8	3.22	19
97667	2-02	1.02	.201	. 205	9. 98	7918	38.6 9670	47.1	2.52 4.	61
97667	<b>3-03</b> (	1.021	.201	<i>2</i> 05	1 <b>0.</b> 44	8050	39.2 9640	47	2.42 4.0	67
<b>976</b> 67	4 <del>-8</del> 4	1.027	.2	. 205	1 <b>0.</b> 46	8200	39. 9 9860	48	2.12 4.0	le
				,	, ;	~	For the second	2.3		10
AVERAGE		1.823	.201	. 2 <b>0</b> 5	10.11		38.8	*;- <b>47.2</b>	2.57	10
SD. DEV		. 0033	0	0	. 44		1.002	.542 [°]	.469 D.90	9

*@5-16-1997*TEST CONDUCTED BY GS

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TENSILE TEST, 0.2 % OFFSET YIELD

#16RP6 C16/C16	
OCT98 TEST1 F019-002	SLVT/ALTFU VPPA 2195
FILENAME FOR DISK TEST PARAMETERS PANEL 1.D.	PROGRAM WELD PROCESS MATERIAL
24000 <b>x</b> 2 / 2 1.985	STANDARD
LOAD RANGE, LBS PRE / POST-YD STRAIN RNG, X GAGE LENGTH, INCHES	SERVO CONTROL FILENAME

声バ	4.06	5,38	4.72	0.433
<u>_</u> 4#×	2.17	2.87	2.52	<b>%</b>
ULT	40.3	45.1	42.7	3.42
S81 NLT	8220	9250		
.2% YD KSI	35.6	36.8	36.2	. 893
.2% YD LBS	7260	7550		
MODULUS	9.5	9.95	57.6	.32
AREA SQ. IN	.204	.205	, 205	0
THK	۶.	.201	۶:	0
NCHES	1.021	ا 1.02	1.02	0
SPEC 10	TR1 (SRTOJ) 1.021	1R2(5P		
# XXXXX	981090	981090	AVERAGE	SO. DEV

10-02-1998 13:28:28

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TENSILE TEST, 0.2 % OFFSET YIELD

# 16RP7 C16/C16
OCT98 TEST1 - F020-002 SLUT/ALTFW VPPA 2195
FILENAME FOR DISK TEST PARAMETERS PANEL 1.D. PROGRAM WELD PROCESS
24000 x 2 / 2 1.985 STANDARD
LOAD RANGE, LBS 24 PRE / POST-YD STRAIN RNG, % 2 GAGE LENGTH, INCHES 1. SERVO CONTROL FILENAME ST

<b>一市</b> ン	2.54	6.60	4.57	2.871
<b>ぺ</b> ∺*	1.159	3.53	2.34	1.674
ULT	37.4	4.4.4	6.04	4.95
ULT	7640	8990		
.2% YD KSI	0	35.7	17.84	25.2
.2% YD LBS	0	7230		
MODULUS	10.33	10.36	10.35	.0224
AREA SQ. IN	.204	.203	.203	0
THK	?	<del>2</del> .	.1995	0
NCHES	1.022	) 1.018	1.02	0
SPEC 1D	TR1(SRTOI) 1.022	TR2(5/2701) 1.018		
**	981091	981091	AVERAGE	SO. DEV

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TEST CONDUCTED BY GS

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TENSILE TEST, 0.2 % OFFSET YIELD

#17RP6
0CT98 TEST1 F021-002 SLWI/ALTFW VPPA 2195
FILENAME FOR DISK TEST PARAMETERS PANEL I.D. PROGRAM WELD PROCESS
24000 ( 2 / 2 1.985 STANDARD
LOAD RANGE, LBS PRE / POST-YD STRAIN RNG, X GAGE LENGTH, INCHES SERVO CONTROL FILENAME

	4.26	4.77	4.52	0.359
<u>_</u> 4	2.22	2.52	2.37	.214
ULT KSI	53	8.54	47.7	1.972
ULT	8550	9110		
.2% YD KSI	34.8	32.5	33.6	1.622
.2% YD LBS	6920	64.70		
MODULUS	8.25	8.71	8.48	.328
AREA SQ. IN	.199	.1992	1991	•
THK INCHES	۲.	.2	۲:	0
NO INCHES	566. (	966.	%.	0
SPEC 1D	TR1 (SRTOI) .995	TR2(5/2/101).996		
WORK #	981095	981095	AVERAGE	SD. DEV

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TENSILE TEST, 0.2 % OFFSET YIELD

#17RP7 C17/C17	
OCT98 TEST1 F022-002 SLUT/ALTFW VPPA 2195	
FILENAME FOR DISK TEST PARAMETERS PANEL 1.D. PROGRAM WELD PROCESS	
24000 : 2 / 2 1.985 STANDARD	
LOAD RANGE, LBS PRE / POST-YD STRAIN RNG, X GAGE LENGTH, INCHES SERVO CONTROL FILENAME	

<u>- h:/</u>	3.55	4.67	4.11	0,790
_4	1.914	2.77	2.34	909.
ULT	7.44	48.3	46.5	2.54
ULT ULT	8970	9720		
.2% YD KSI	39.6	39.7	39.6	7290.
.2% YD LBS	7940	0662		
MODULUS	10.26	10.49	10.37	.1606
AREA SQ.IN	.201	.201	.201	0
THK	.201	.202	.202	0
LO INCHES	%6.(	2).997	866.	0
SPEC 1D	TR1(52701)	TR2(5/2/02).997		
WORK #	981082	981082	AVERAGE	SD. DEV

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TENSILE TEST, 0.2 % OFFSET YIELD

#182P6 C18/C18
•
OCT98 TEST1 F017-002 SLWT/ALTFW VPPA 2195
FILENAME FOR DISK TEST PARAMETERS PANEL 1.D. PROGRAM WELD PROCESS MATERIAL
24000 4 2 / 2 1.985 STANDARD
LOAD RANGE, LBS 24000 PRE / POST-YD STRAIN RNG, % 2 / 2 GAGE LENGTH, INCHES 1.985 SERVO CONTROL FILENAME STANDAI

- 声/~	5,18	9.75	7.46	3,230
<u>(</u> 4	2.82	76.4	3.88	1.496
ULT KSI	42.5	8.97	9.47	3.04
ULT	8490	9310		
.2% YD KSI	33.6	38.5	36.1	3.44
.2% YD LBS	6720	7660		
MODULUS	9.08	10.58	9.83	1.054
AREA SQ.IN	.1998	<del>2.</del>	1994	0
THK INCHES	~:	7.	?:	0
NO INCHES	66.(1	2).995	766.	0
SPEC 10	TR1 (SPTO1).999	TR2 (S/2TO2).995		
WORK #	981083	981083	AVERAGE	SD. DEV

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TEST CONDUCTED BY GS

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TENSILE TEST, 0.2 % OFFSET YIELD

#18RP7		712/212			
00198	TEST1	F018-002	SLWT/ALTFW	VPPA	2195
FILENAME FOR DISK	TEST PARAMETERS	PANEL 1.D.	PROGRAM	WELD PROCESS	MATERIAL
24000	2/2	1.985	STANDARD		
LOAD RANGE, LBS	PRE / POST-YD STRAIN RNG, X	GAGE LENGTH, INCHES	SERVO CONTROL FILENAME		

世:/-	4.37	5.89	5.13	1.077
<i>~</i> # <i>P</i> ≠ <i>×</i>	2.17	3.02	2.59	909.
ULT	42.7	44.3	43.5	1.151
NLT ULT	8450	8840		
.2% YD KSI	35.1	36.3	35.7	.826
.2% YD LBS	0569	1240		
MODULUS	13.56	10.02	11.79	2.5
AREA SQ. IN	. 198	.1994	1887	0
THK	.1%	7:	.1%5	0
NCHES	.) .995	2).997	%.	0
SPEC 1D	TR1(SRTOI)	TR2 (5/2702)		
# #	981081	981081	AVERAGE	SD. DEV

10-01-1998 09:52:53

TEST CONDUCTED BY GS

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### $\begin{array}{c} \textbf{APPENDIX J} \\ \textbf{J}_{ic} \textbf{ WELD TEST DATA} \end{array}$

## VPPA WELD JIC DATA - WELD CENTERLINE

	T				П				П				П	$\neg$	$\neg$					П	$\neg$	-	_	$\neg$	$\neg$	1	1	7	7	
Invalid Sections	94.15, 9416, and 9417	22,94	941.5, 9416, and 9417		9415,941.6, and 9417	9415,94.16, and 9417	9 4.1 5, 9 4 1.6, and 9.4.1.7		9415,9416, and 9417	9415,9416, and 9417	9415,9416, and 9417		9415,9416, and 9417	5, 9	9415,9416, and 9417		Void Test	9415,9416, and 9417		9416, and 9417	9415,9416, and 9417		9415,9416, and 9417	9.4 1 6, and 9 4	9415,9416, and 9417		9416, and 9417	Void Test	9415,9416, and 9417	
שור=פר																														
KJ Ksi - in ⁴ 5		37.9	22.8	31 50	280	250	25 5	26 17	32 4	34 4	26.8	31.20	27.1	25 9	273	26 77		32.7	32.7	268	26 9	26 9	32.4	30.9	285	30 60	25.5		210	23.3
(g) ri	0 0092	9600 0	0 0085		9800 0	0 0084	0.0085		0 0092	0 0093	0 0088		9800 0	0 0085	0 0085			0 0093		9800 0	9800 0		0 0091	06000	0 0088		0 0084		0 0082	
JO n-lbf/in^2	103 7	130.7	473	93 90	712	57.0	59 2	62 47	H	107 4	65 1	89.33		Т	9 / 9	65 10		696	6 96	653	65.7	9 99	Н	868	740	85 50	59.2		400	49.6
<del></del>		R	RT	AVERAGE	-320	-320	-320	AVERAGE	RT	RT	RT	AVERAGE	-320	-320	-320	AVERAGE	RT	RT	AVERAGE	-320	-320	AVERAGE	RT	RT	RT	AVERAGE	-320	-320	-320	AVERAGE
TEST PARAMETERS MEDIA TEMP	AIR	AIR	AIR		LN2	LN2	П		AIR	AIR	AIR		LN2	LN2	LN2		AIR	AIR		ZN7	LN2		AIR	AIR			LN2	LN2	LN2	
MATERIAL	AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-U 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195	i	AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195	İ
TEST		ľ			Oll		၁၂		Г	ဍ				일	ĺ		1	읔		25			1	ı	양		일	ΙI		
ON Q	16A-CRJ01	16A-CRJ02	16B-CRJ03		16A-CCJ01	16B-CCJ02	16B-CCJ03		18A-CRJ01	18A-CRJ02	18B-CRJ03		18A-CCJ01	18B-CCJ02	18B-CCJ03		19A-CRJ01	19A-CRJ02		19B-CCJ02	19B-CCJ03		20A-CRJ01	20A-CRJ02	20B-CRJ03		20A-CCJ01	20B-CCJ02	20B-CCJ03	

PART II 2195 FILLER WIRE DEVELOPMENT PROGRAM

## C19/C16 REPAIR WELD JIC DATA

_		_	-r-	7		_	_	,	_	_			_		_	I		_		l					_			Ì	_		
	Invalid Sections	Void Toet	7 1 1 and 9 2 2			9415and9416	9415and 9416		9145, and 9417	9415 and 9417	9417		9415, and 9417	9415,9416	9415,9416, and 9417		9415,9416, and 9417	9416	9417		9415 and 9417	9415, 9416, and 9417	842,9415,9416, and 9417		9415	9415,9416, and 9417	9415and 9417		9415, and 9417	9415, and 9416	
	Jq=Jıc																														
	3	KSI - IU. D	52 70	2 3	62 70	31 80	35 40	33.60	54 80	33 80	53 20	47.27	35 60	34 00	33 30	34 30	52 10	49 40	49 40	20 30	32 10	38 40	36 90	35 80	38 60	43 00	41 40	41 00	27 90	33 50	30.70
	a(Q)	<b>=</b>	0.0118	2		0 0093	0 0094		0 0109	0600 0	0 0107		0 0092	0600 0	0600 0		0 0113	0 0109	0 0109		0 0092	8600 0	9600 0		0 0093	9600 0	0 0095		9800 0	6800 0	
	O J	7u/101-u	252 30	22.5	252.30	92 00	114 10	103.05	273 20	103 90	257 60	211.57	115 30	105 10	100 60	107.00	246 80	221 60	221 60	230.00	93 70	140 50	123 70	119.30	135 20	168 00	155 70	152.97	20 60	102 00	86.30
METERS	TEMP	†	- L		AVERAGE	RT	R.	AVERAGE	-320	-320	-320	AVERAGE	-320	-320	-320	AVERAGE	RT	RT	RT	AVERAGE	RT	F.	RT	AVERAGE	-320	-320	-320	AVERAGE	-320	-320	AVERAGE
TEST PARAMETERS	MEDIA	٩	Z A	7	∢	AIR	AIR	<b>A</b>	LN2	LN2	LN2		LN2	LN2	LN2		AIR	AR	AIR		AIR	AIR	AIR	¥	LN2	LN2	LN2	<b>A</b>	LN2	LN2	<b>*</b>
	MATERIAL	11 2405/2405	AL-LI 2195/2195			AL-LI 2195/2195			AL-LI 2195/2195				AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195				AL-LI 2195/2195		AL-LI 2195/2195		AL-LI 2195/2195				AL-LI 2195/2195	AL-LI 2195/2195	
	TEST	٤	٤	2		OI?	25		Sic	25	ဍ		JIC	JIC	ဍ		210	ဍ	25		SIC	၁	SIC		215	25	25		JIC	၁	
	OTHER	10 NO	16R02-FR 102	10104-11004		16R01-CRJ01	16R02-CRJ02		16R04-FCJ01	16R05-FCJ02	16R05-FCJ03		16R04-CCJ01	16R05-CCJ02	16R05-CCJ03		16RP1-FRJ01	16RP2-FRJO2	16RP3-FRJ03		16RP1-CRJ01	16RP2-CRJ02	16RP3-CRJ03		16RP4-FCJ01	16RP5-FCJ02	16RP5-FCJ03		16RP4-CCJ01	16RP5-CCJ02	

PART II 2195 FILLER WIRE DEVELOPMENT PROGRAM

## C20/C17 REPAIR WELD JIc DATA

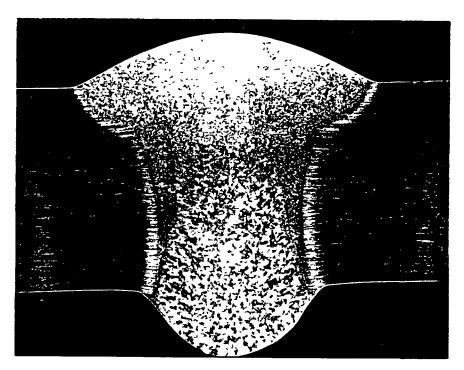
Invalid Sections	Tost	9	711,92.2, 9.4.1.5, and 94.1.7		9415,9416, and 9417	9415and9416	9415 and 9417	-	922, 932, 9415, 9416, and 9417	9415,9416, and 9417	842,9415,9416, and 9417		2	5,9416, and 9417	415 and 9417			5	9415 and 9417		9415 and 9417	5 and 9 4 1. 7	9415,9416, and 9417		9415,9416, and 9417	842,9415, and 9416		9415,9416, and 9417	9415, and 9416	9 4 1 5 and 9.4.1 7	
. <u>i</u>	Void Test	9416	711		941	941	941		922	941	8 4 2		941	9415,	94		- 8	941	941		94	941	941		941	8 4 2		941	941	941	
Jq=Jic																	Yes														
3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	KSI - 111 3	44 50	83 60	54 05	42 90	40 10	36 70	39 90	33 50	48 20	42 50	41.40	31 20	26 00	26 30	27 83	51 30	44 90	28 10	41.43	24 20	27 50	24 70	25 47	39 40	36 50	37.95	22 90	24 60	27 00	24.83
(O) e		0 0 104	0 0130		0 0102	6600 0	9600 0		0 0089	6600 0	0 0095		0 0087	0 0085	0 0085		0 0 109	0 0101	0 0088		0 0085	0 0087	6000 0		0 0091	06000		0 0083	0 0083	0 0084	
D CAMPA	7.11111011-111	179 80	368 00	273 90	167 00	146 20	122 70	145 30	102 00	211 20	163 90	159 03	88 40	61 30	62 70	70 80	245 90	183 20	71 70	166 93	53 20	06 89	55 50	69 20	141 30	120 90	131.10	47 70	55 00	66 30	56 33
AMETERS TEMP	- la	R	RT	AVERAGE	R	R	F.	AVERAGE	-320	-320	-320	AVERAGE	-320	-320	-320	AVERAGE	RT	RT	RT	AVERAGE	RT	RT	RT	AVERAGE	-320	-320	AVERAGE	-320	-320	-320	AVERAGE
MEDIA TEMP	AIR	AIR	AIR	•	AIR	AIR	AIR		LN2	LN2	LN2	•	LN2	LN2	LN2	•	AIR	AIR	AIR	•	AIR	AIR	AIR		LN2	LN2		LN2	LN2	LN2	
MATERIAL	AI -11 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195	
TEST		2	ဍ		ဍ	ဍ	ဋ		SIC	)IC	SIC		25	၁၂	၁၂		JIC	၁	SIC		25	၁	일		25	ဍ		SIC	SIC	SIC	
OTHER	17R01-FR.101	17R02-FRJ02	17R03-FRJ03		17R01-CRJ01	17R02-CRJ02	17R03-CRJ03		17R04-FCJ01	17R05-FCJ02	17R05-FCJ03		17R04-CCJ01	17R05-CCJ02	17R05-CCJ03		17RP1-FRJ01	17RP2-FRJ02	17RP3-FRJ03		17RP1-CRJ01	17RP2-CRJ02	17RP3-CRJ03		17RP4-FCJ01	17RP5-FCJ02		17RP4-CCJ01	17RP5-CCJ02	17RP5-CCJ03	

PART II 2195 FILLER WIRE DEVELOPMENT PROGRAM

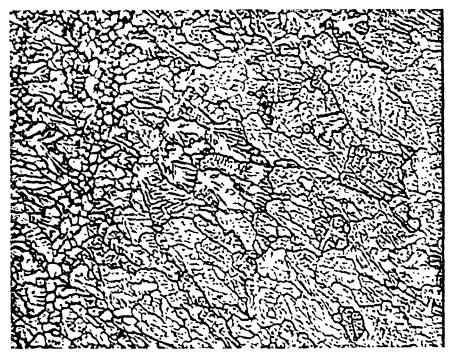
### C16/C18 REPAIR WELD JIc DATA

	c Invalid Sections	711,8436,922,9416, and 9417	Void Test	8 4 2, 7 1 1, and 8 4 3 6		Void Test	9415,9416,	9415, and 94		9415,9416, and 9417	9417	9415, and 9416		9415	9415, and 9417	9415,9416, and 9417			8436 and 9416	9415 and 9416		9415,9416, and 9417	9415 and 9417	9415 and 9417		9415,9416, and 9417	None	9415,9416, and 9417		9416, and 9417	Void Test	9415, and 9417	
	Jq=Jic																	Yes									Yes						
	KJ ksi - in ⁴ 5	58 10		0E ES	65.70		32 30	21 90	27 10	42 70	42 30	32 10	39 03	29 50	31 10	32 60	31.07	53 10	57 80	46 50	52.47	31 40	27 30	23 30	27.33	44 80	48 80	40 20	44.70	26 60		27 20	26.90
	(Q) (E)	0 0124		0 0117			0 0093	0 0085		9600 0	0 0096	0 0089		0 0087	0 0088	6800 0		0 0108	0 0114	0 0102		0 0089	0 0087	0 0085		96000	0 0100	0 0093		0 0084		0 0085	
	JQ in-lbf/in^2	307 10		258 70	282.90		95 00	43 70	69.35	166 00	162 80	93 60	140 80	79 10	87 70	96 40	87.73	254 40	304 00	196 60	251.67	99 20	67 80	49 20	68.83	182 20	216 50	149 20	182 63	64 30		67 30	65 80
TEST PARAMETERS	TEMP	RT	R	RT	AVERAGE	RT	ᅜ	RT	AVERAGE	-320	-320	-320	AVERAGE	-320	-320	-320	AVERAGE	RT	RT	RT	AVERAGE	RT	RT	RT	AVERAGE	-320	-320	-320	AVERAGE	-320	-320	-320	AVERAGE
EST PAR	MEDIA	AIR	AIR	AIR	<b>q</b>	AIR	AIR	AIR	•	LN2	LN2	LN2	•	LN2	ZN3	ZN2		AIR	AIR	AIR		AIR	AIR	AIR	•	LN2	LN2	CN2		LN2	LN2	LN2	
Ι.,	MATERIAL	AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195		AL-LI 2195/2195	AL-LI 2195/2195	AL-LI 2195/2195	
	TEST TYPE	읔	ဍ	읔		25	일	일		일	왕	일		일	일	일		일	일	일		일	SIC.	SIC		알	ı	l	l	양	၁၂	일	
	OTHER ID NO	18R01-FRJ01	18R02-FRJ02	18R03-FRJ03		18R01-CRJ01	18R02-CRJ02	18R03-CRJ03		18R04-FCJ01	18R05-FCJ02	18R05-FCJ03		18R04-CCJ01	18R05-CCJ02	18R05-CCJ03		18RP1-FRJ01	18RP2-FRJ02	18RP3-FRJ03		18RP1-CRJ01	18RP2-CRJ02	18RP3-CRJ03		18RP4-FCJ01	18RP5-FCJ02	18RP5-FCJ03		18RP4-CCJ01	18RP5-CCJ02	18RP5-CCJ03	

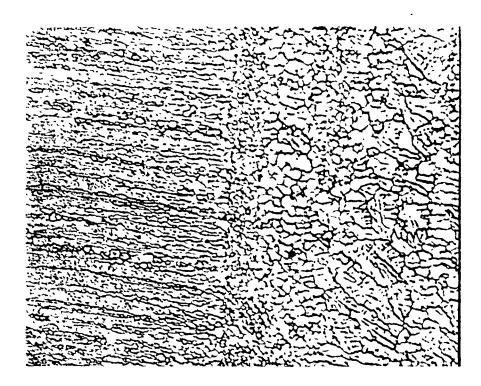
### APPENDIX K 0.320t VPPA WELD METALLOGRAPHY



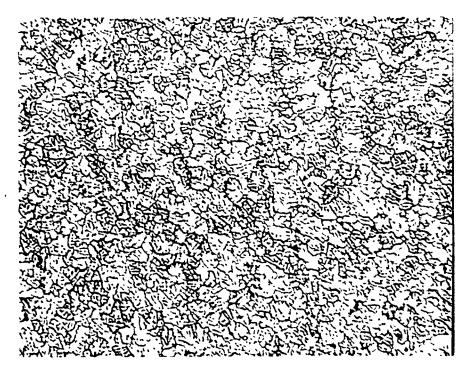
Chemistry 15 - 0.320-inch-thick 2195-T8R70/2195-T8R70 VPPA Weld (6x)



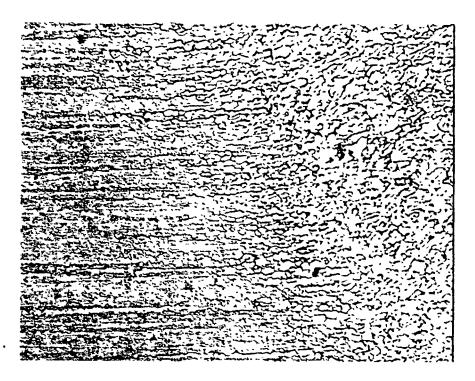
Chemistry 15 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Zone (100x)



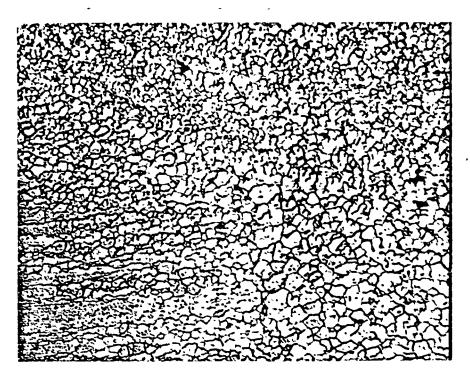
Chemistry 15 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Line (100x)



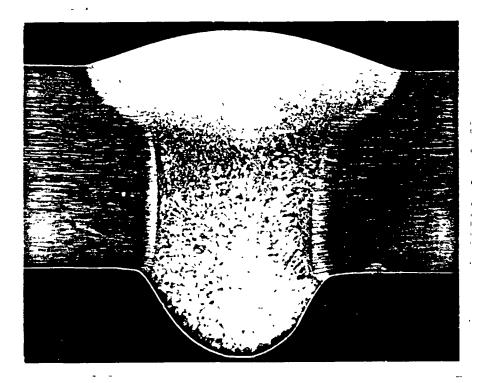
Chemistry 15 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Zone (100x)



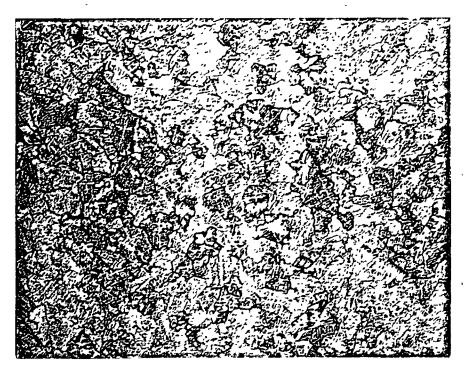
Chemistry 15 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Line (100x)



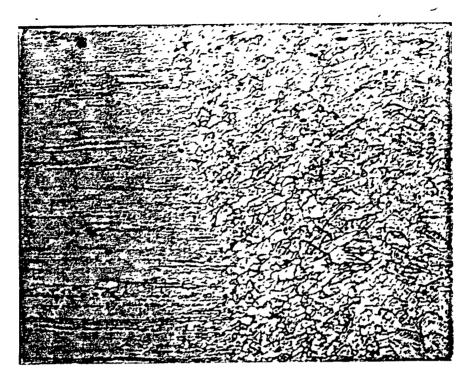
Chemistry 15 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass/Cover Pass/Plate Intersection (100x)



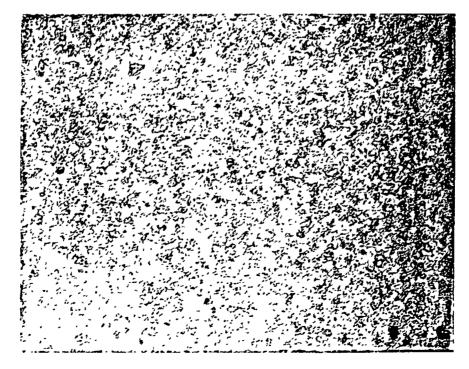
Chemistry 16 - 0.320-inch-thick 2195-T8R70/2195-T8R70 VPPA Weld (6x)



Chemistry 16 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Zone (100x)



Chemistry 16 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Line (100x)



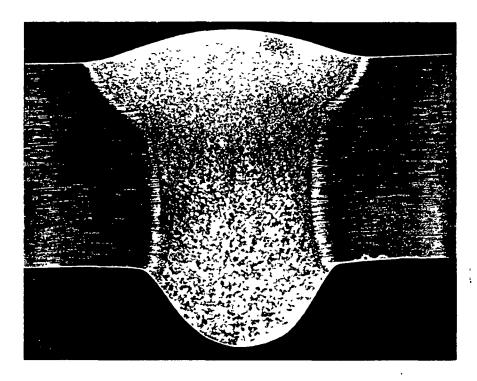
Chemistry 16 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Zone (100x)



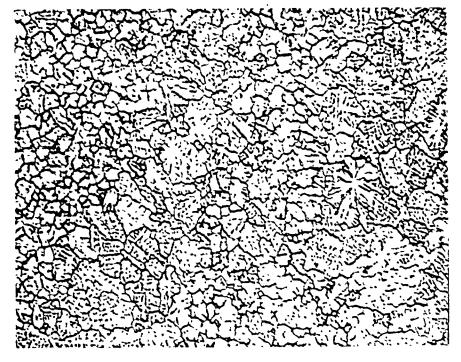
Chemistry 16 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Line (100x)



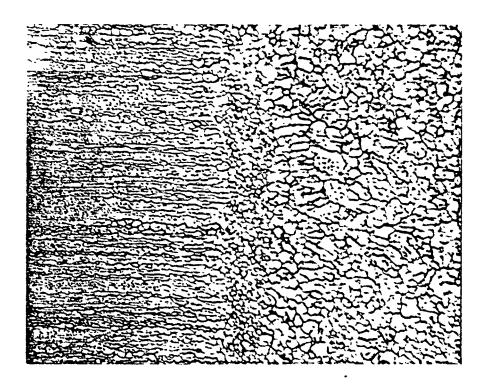
Chemistry 16 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass/Cover Pass/Plate Intersection (100x)



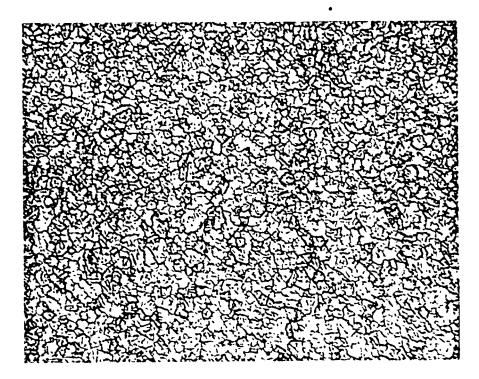
Chemistry 17 - 0.320-inch-thick 2195-T8R70/2195-T8R70 VPPA Weld (6x)



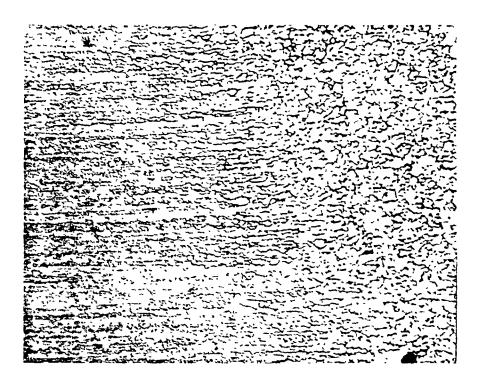
Chemistry 17 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Zone (100x)



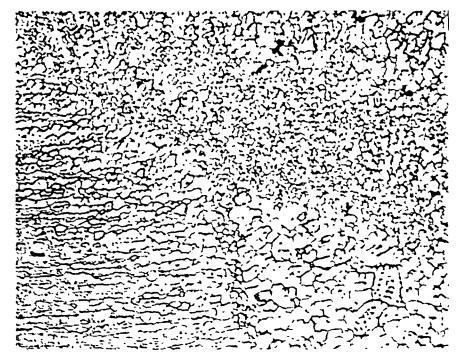
Chemistry 17 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Line (100x)



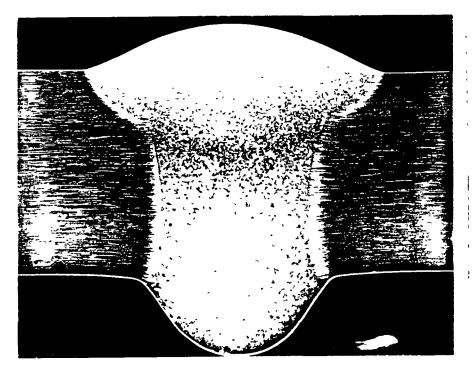
Chemistry 17 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Zone (100x)



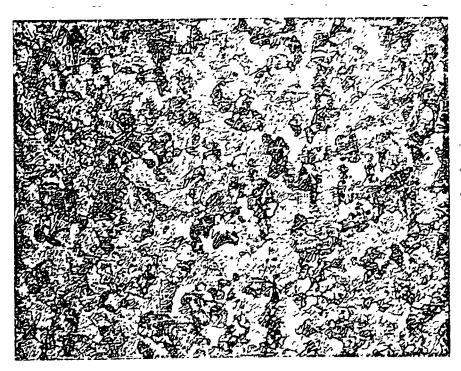
Chemistry 17 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Line (100x)



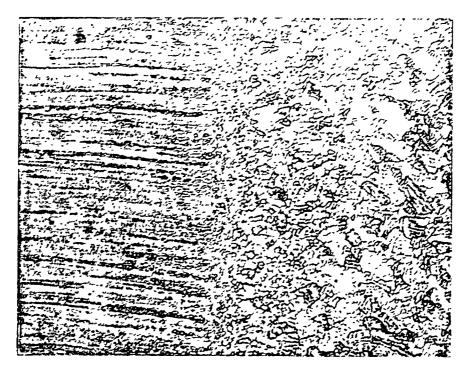
Chemistry 17 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass/Cover Pass/Plate Intersection (100x)



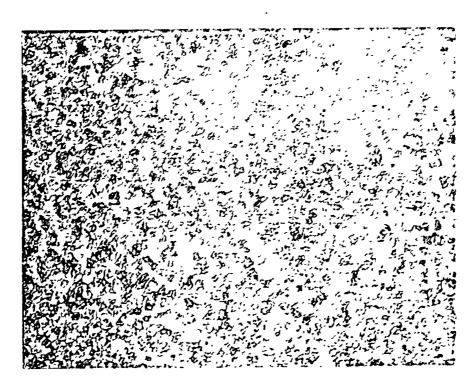
Chemistry 18 - 0.320-inch-thick 2195-T8R70/2195-T8R70 VPPA Weld (6x)



Chemistry 18 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Zone (100x)



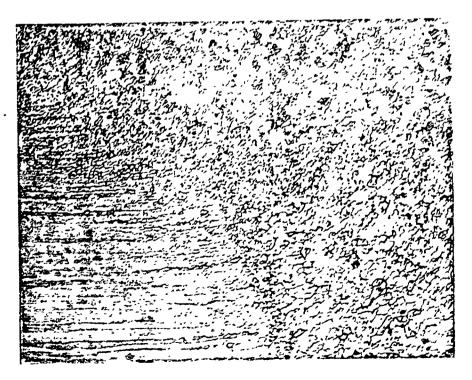
Chemistry 18 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass Fusion Line (100x)



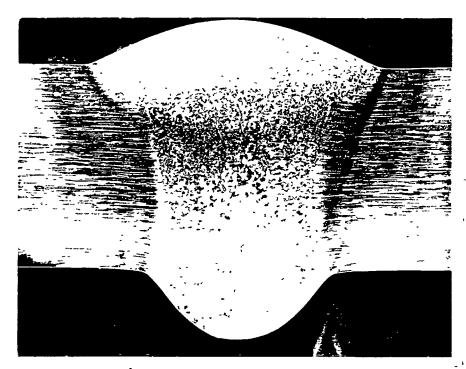
Chemistry 18 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Zone (100x)



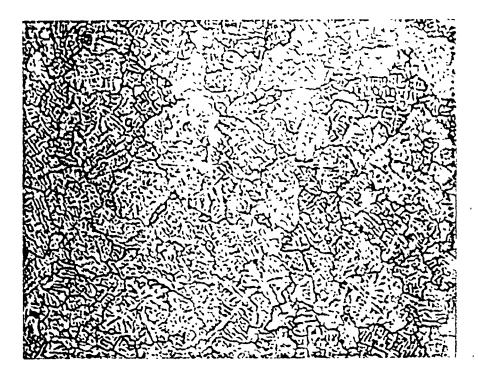
Chemistry 18 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Line (100x)



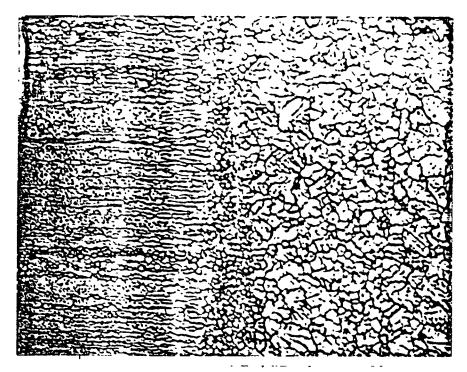
Chemistry 18 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Root Pass/Cover Pass/Plate Intersection (100x)



Chemistry 19 - 0.320-inch-thick 2195-T8R70/2195-T8R70 VPPA Weld (6x)



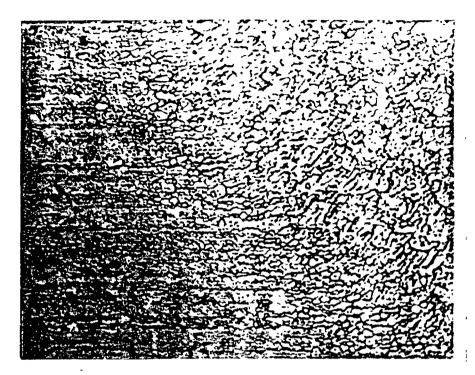
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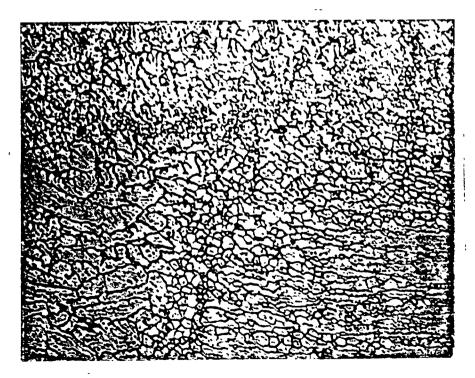
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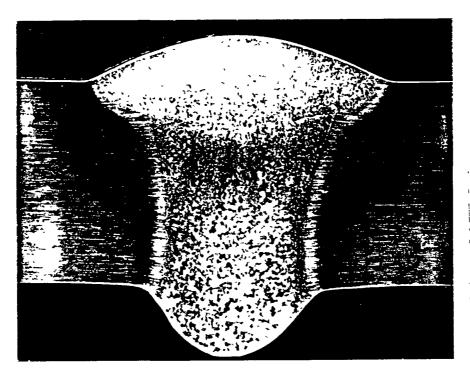
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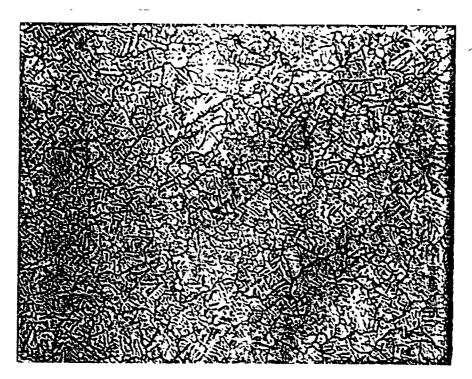
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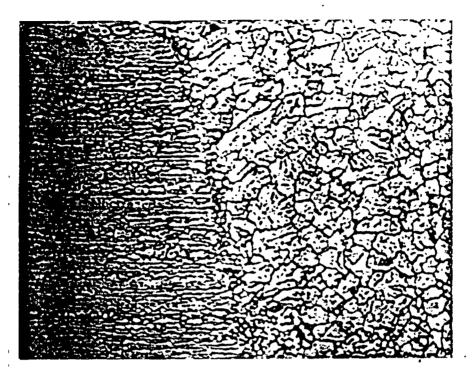
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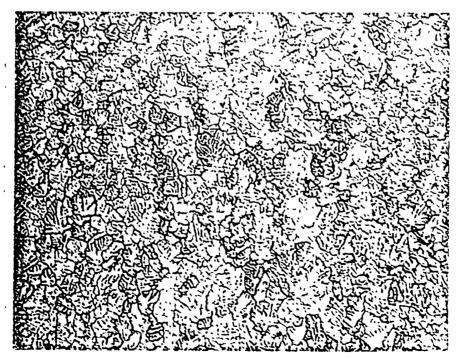
Chemistry 20 - 0.320-inch-thick 2195-T8R70/2195-T8R70 VPPA Weld (6x)



Chemistry 20 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 Plate VPPA Weld Root Pass Fusion Zone (100x)

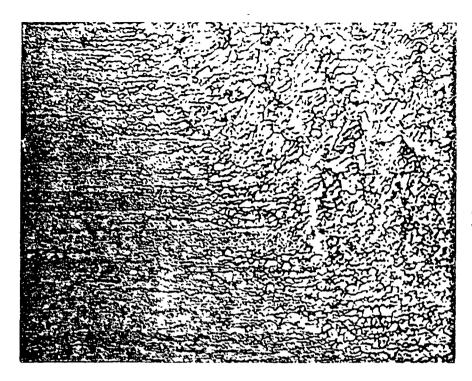


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Chemistry 20 - 0.320-inch-thick 2195-T8R70/ 2195-T8R70 VPPA Weld Cover Pass Fusion Zone (100x)

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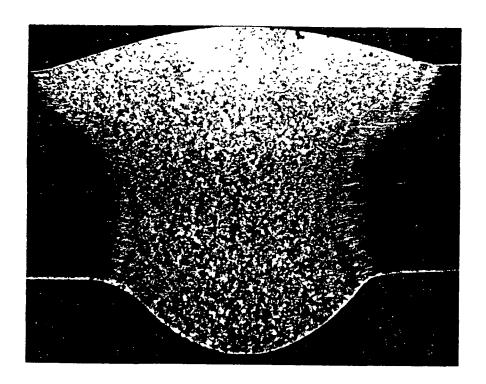


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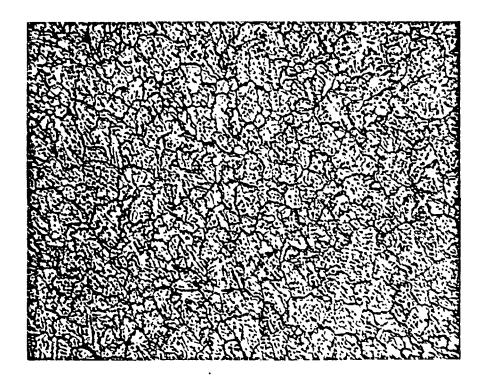


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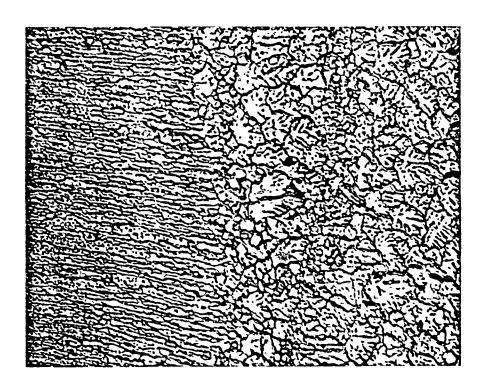
## APPENDIX L 0.200t VPPA WELD METALLOGRAPHY



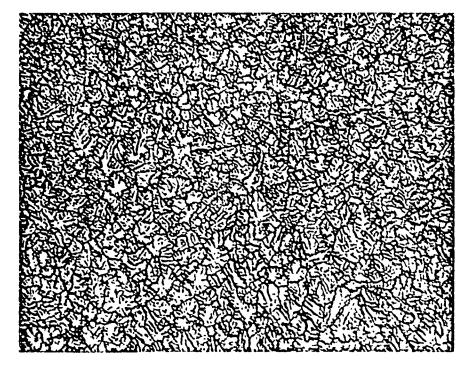
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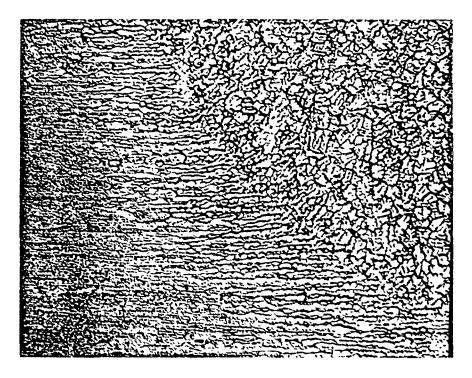
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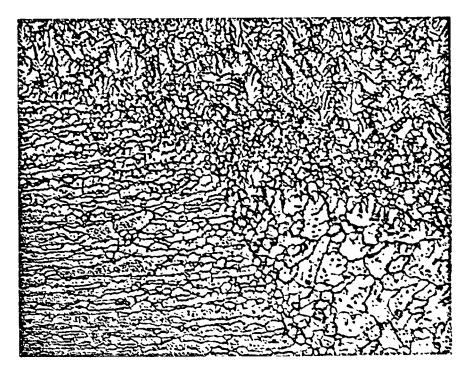
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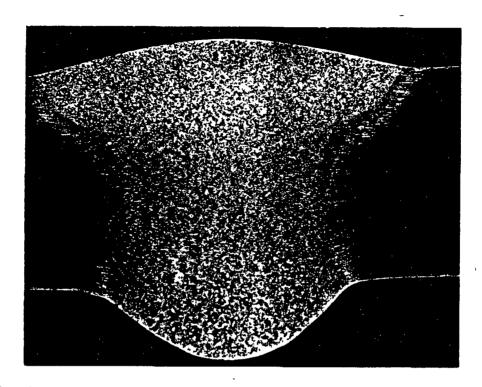
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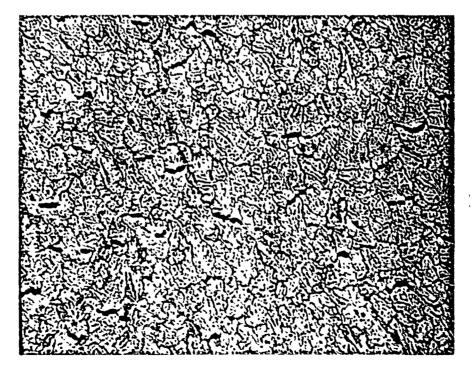
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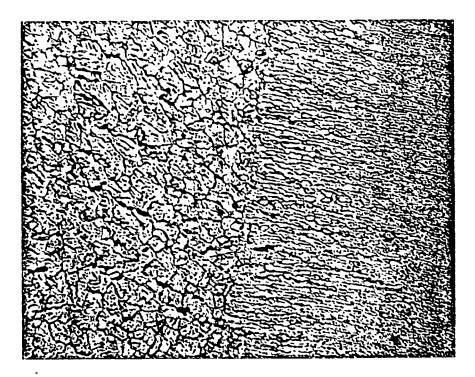
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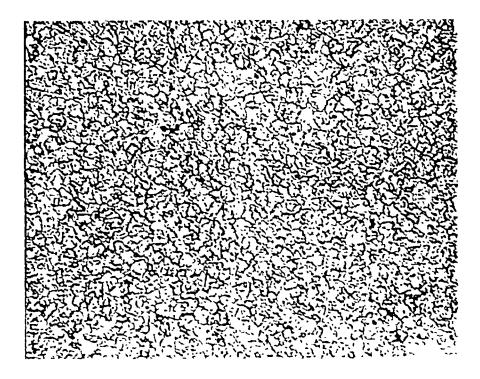
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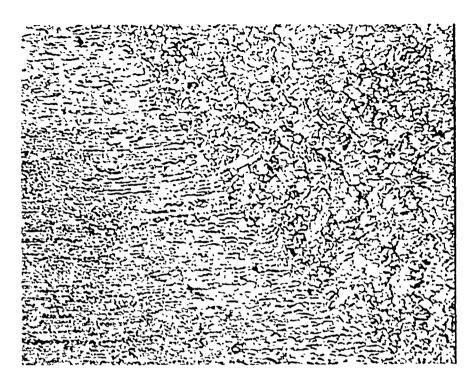
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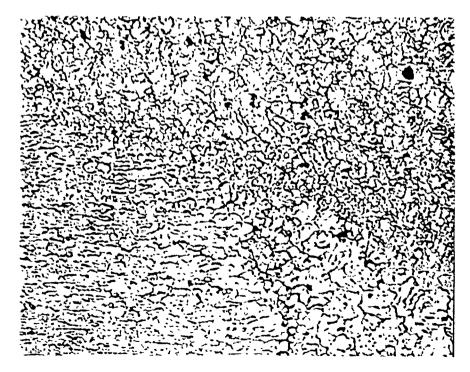
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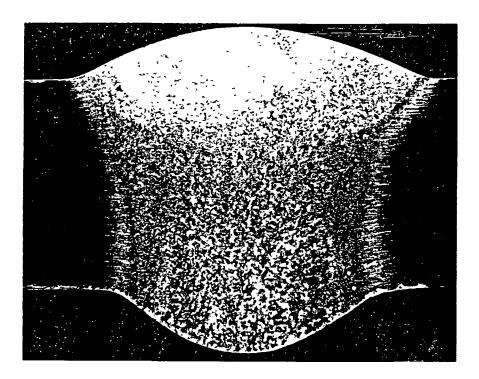
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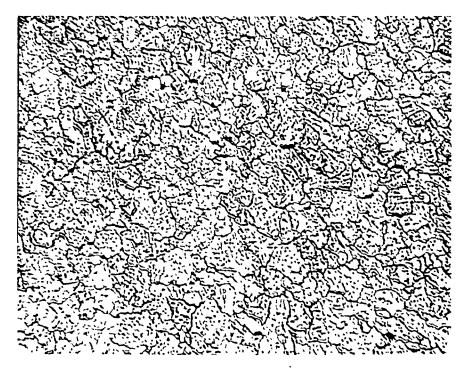
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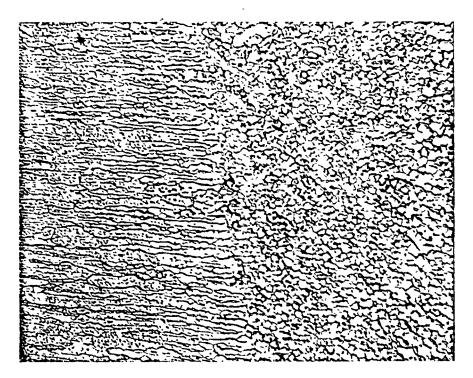
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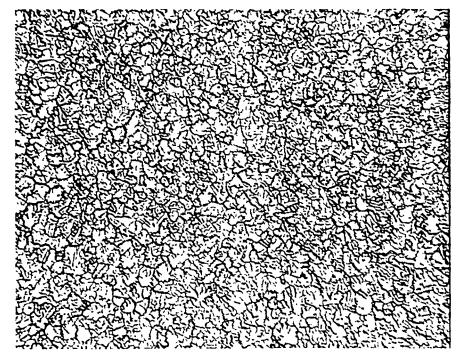
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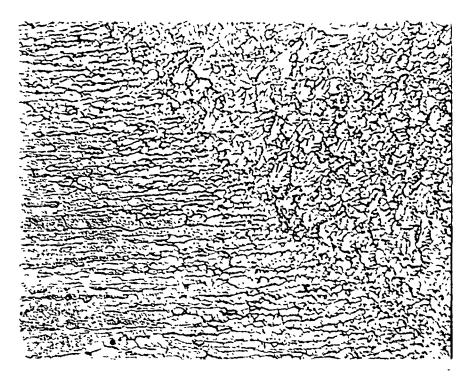
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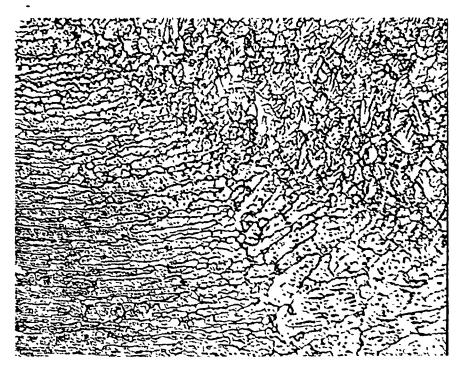
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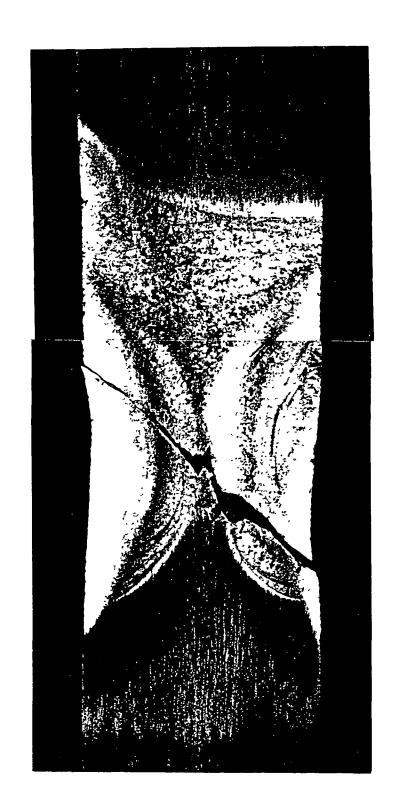


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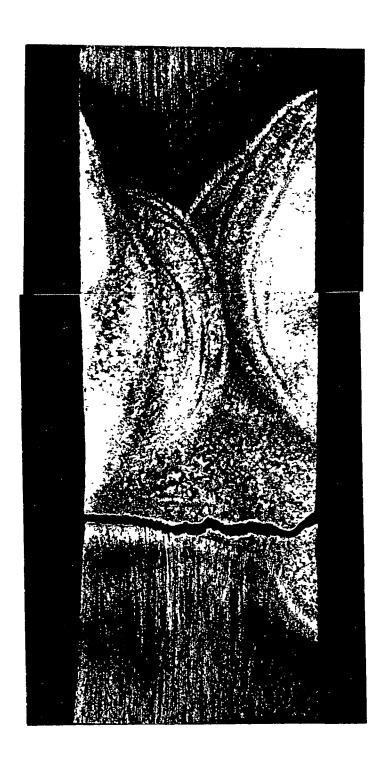


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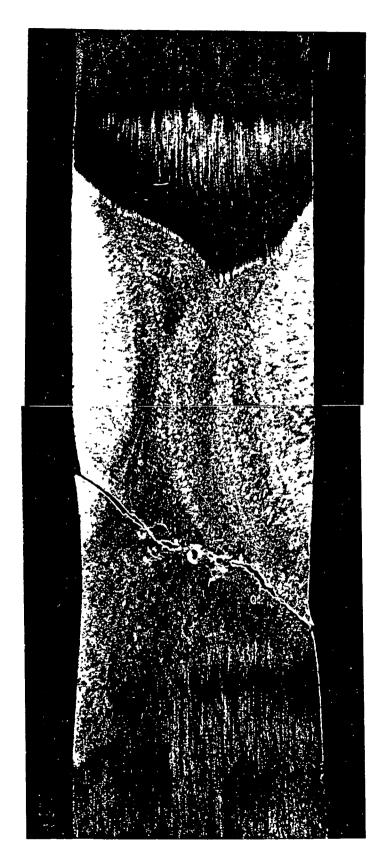
## APPENDIX M REPAIR WELD METALLOGRAPHY



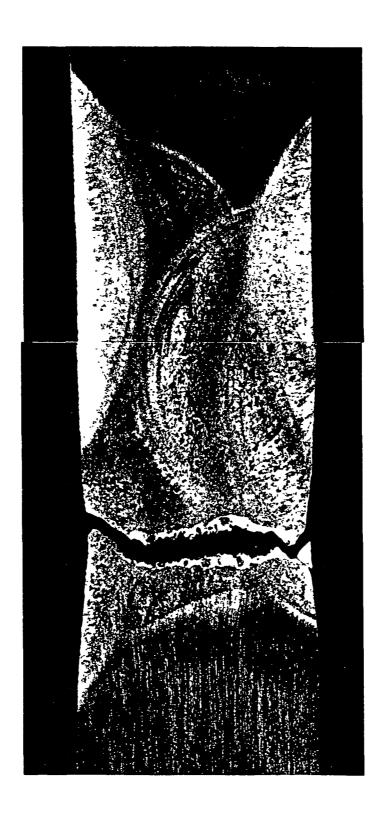
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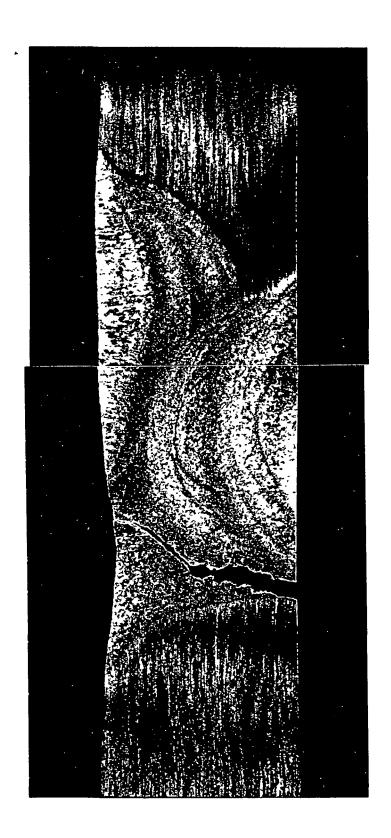
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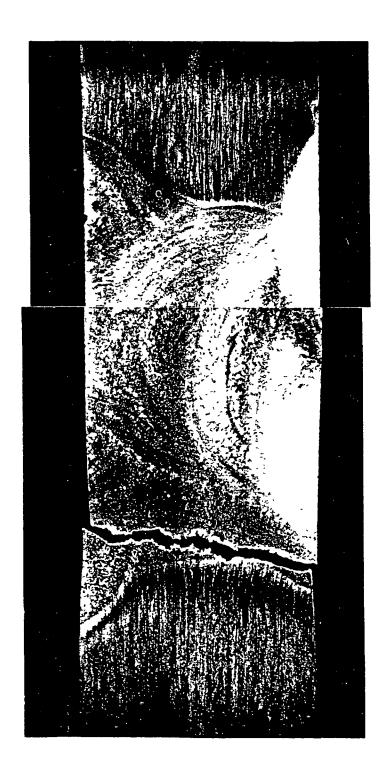
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Chemistry 16 0.200t 2195-T8M4/ 2195-T8M4 VPPAW - Chemistry 16 Planished R5 Fusion Line GTA Repair Weld 16RP6-SCT02 - LN2 Tested 1-inch-wide Shaved Repair Weld Tensile Specimen



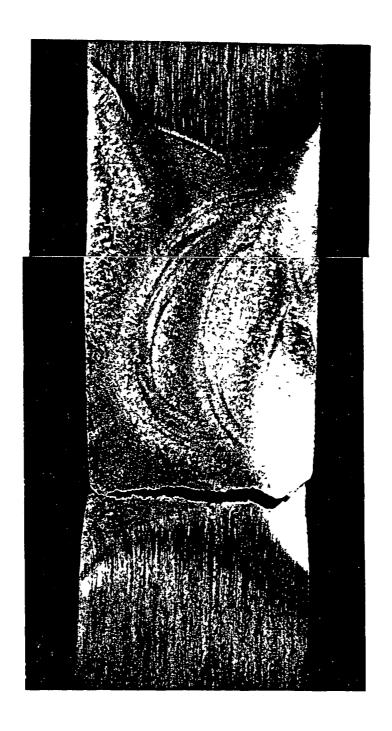
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Chemistry 16 0.200t 2195-T8M4/ 2195-T8M4 VPPAW - Chemistry 16 Planished R5 Fusion Line GTA Repair Weld (12.5x) 16RP7-SCT01 - LN2 Tested 1-inch-wide Shaved Repair Weld Tensile Specimen



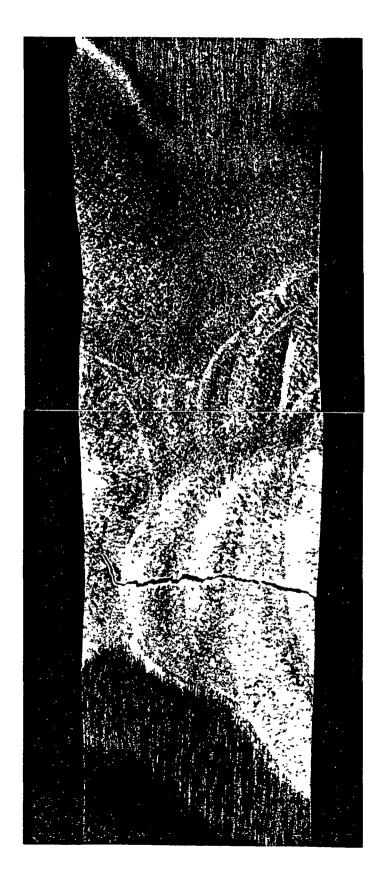
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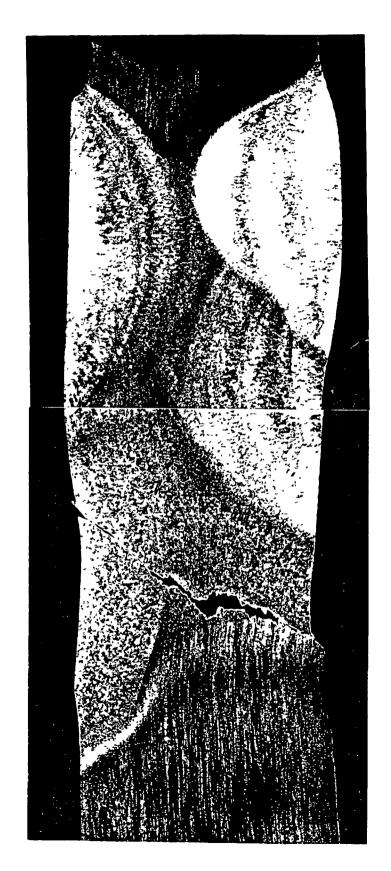
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Chemistry 17 0.200t 2195-T8M4/ 2195-T8M4 VPPAW - Chemistry 17 Planished R5 Fusion Line GTA Repair Weld 17RP6-SRT01 - Room Temperature Tested 1-inch-wide Shaved Repair Weld Tensile Specimen



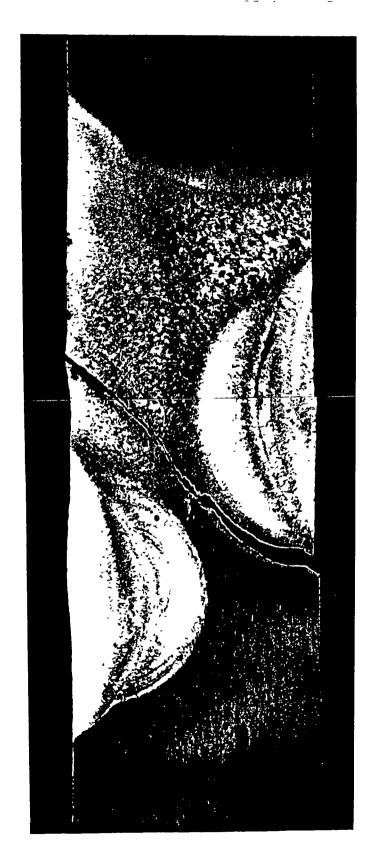
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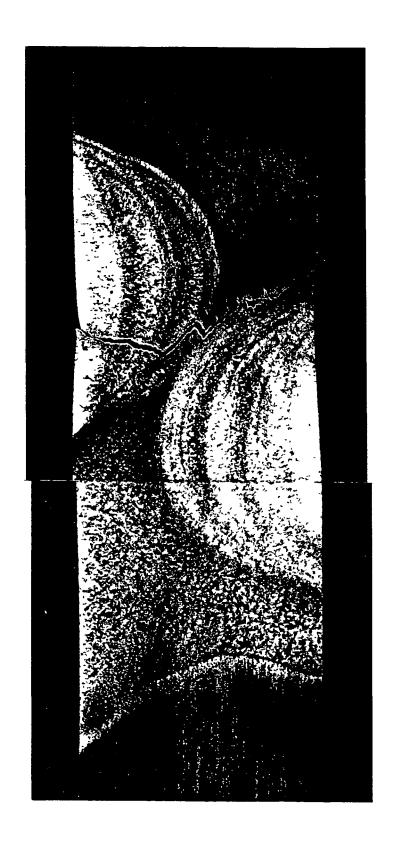
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Chemistry 17 0.200t 2195-T8M4/ 2195-T8M4 VPPAW - Chemistry 17 Planished R5 Fusion Line GTA Repair Weld 17RP6-SCT02 - LN2 Tested 1-inch-wide Shaved Repair Weld Tensile Specimen



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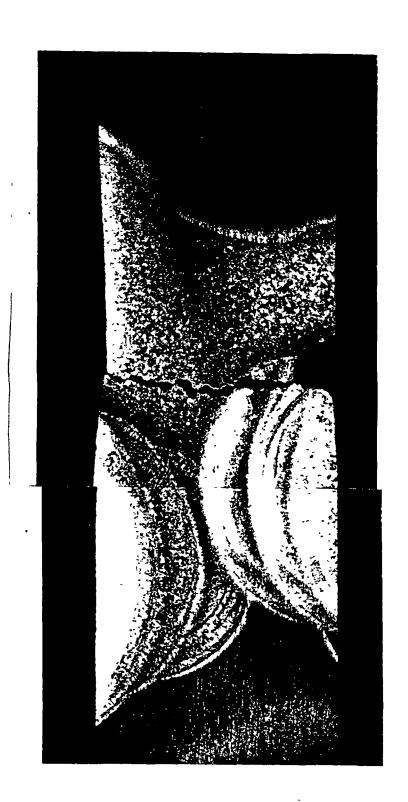


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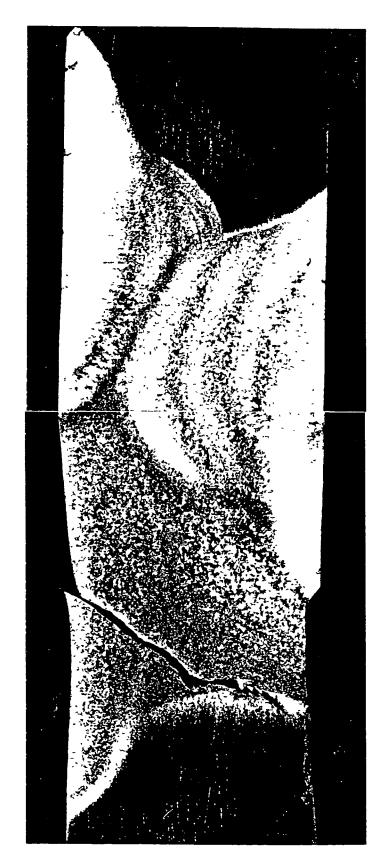


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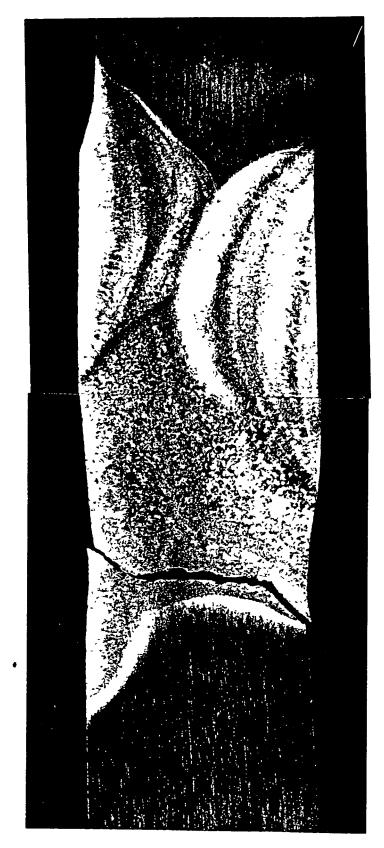
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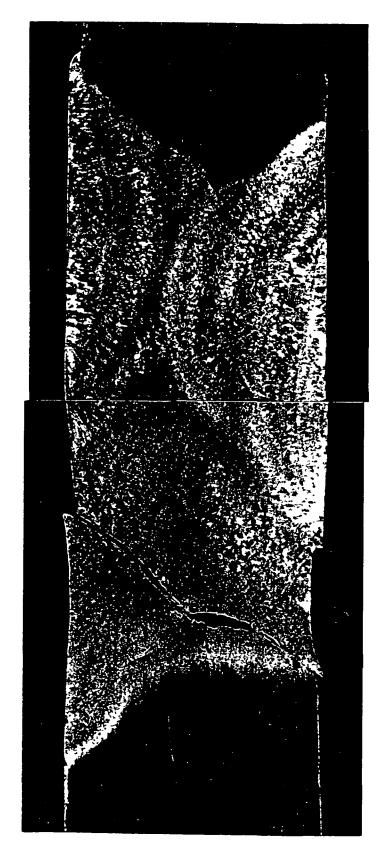
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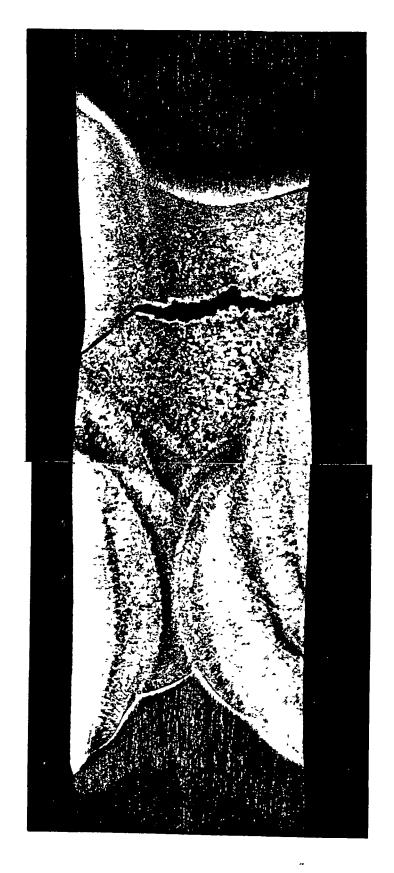
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## APPENDIX N STRESS CORROSION CRACKING